BRITISH COLUMBIA
MINISTRY OF FORESTS

Kingcome Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective October 1, 2002

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Kingcome Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Kingcome TSA encompasses 1 139 200 hectares on northern Vancouver Island, the adjacent mainland, and several small islands. The TSA lies within the British Columbia Forest Service (BCFS) Vancouver Forest Region, and is administered from the Port McNeill forest district office located in Port McNeill. Approximately 51 percent of the total TSA area, or 586 000 hectares, is considered to be productive forest land managed by the BCFS.

The TSA is bordered by the Strathcona, Mid Coast, Williams Lake and Sunshine Coast TSAs, and lies either adjacent to or surrounding portions of several Tree Farm Licences (TFLs), including TFLs 6, 39, 43, 45 and 47.

The Kingcome TSA contains rugged topography, particularly on the mainland portions, and the area is subject to heavy precipitation. The topography of the TSA varies from the poorly drained lowland areas of northern Vancouver Island to the rugged coastal mountains and drier interior conditions found in the upper Klinaklini watershed on the mainland. Western hemlock, amabilis fir and western redcedar are the predominant tree species, with smaller amounts of Sitka spruce, Douglas-fir, cypress, mountain hemlock and alder also present.

In 2000, there were approximately 15,000 persons residing in the area encompassed by the Port McNeill forest district. More than half of the population lives in the two largest communities of Port Hardy and Port McNeill, with the remainder living in smaller communities including Port Alice, Alert Bay, Coal Harbour, Holberg, Winter Harbour, Sointula and Woss.

History of the AAC

The first timber supply analysis for the Kingcome TSA was completed in 1980, and the AAC was subsequently determined at 1 700 000 cubic metres. In 1987, the AAC was reduced to 1 632 500 cubic metres to reflect the transfer of the Loughborough Supply Block to the Strathcona TSA. In 1989, the AAC was increased to 1 769 500 cubic metres and three new non-replaceable forest licences were awarded: one licence for the harvesting of low site productivity conifer stands, and two licences for harvesting in deciduous stands.

In 1993, 3718 hectares of operable area was transferred from TFL 45 to the Kingcome TSA and the AAC was increased to 1 798 270 cubic metres.

In 1996, I set the AAC at 1 399 000 cubic metres, which represented a decrease of 22 percent from the previous AAC. This AAC included a partition of 130 000 cubic metres to low site cedar stands, and 25 000 cubic metres to deciduous stands.

In July 2002, I temporarily reduced the AAC for the Kingcome TSA under section 173 in Part 13 of the *Forest Act*, to account for the temporary designation of the Central Coast Designated Area. The AAC for the Kingcome TSA under this temporary reduction was set at 1 355 000 cubic metres. The reduction totalled 44 000 cubic metres, and was applied as 4000 cubic metres to the low site partition areas, and 40 000 cubic metres to the remainder of the TSA. The existing deciduous partition volume was not affected by the temporary reduction.

The AAC is currently apportioned by the Minister of Forests as follows (note that this apportionment does not yet reflect the temporary AAC reduction made in July 2002):

Apportionment	Cubic metres/year	Percentage
Forest Licences – replaceable	986 689	70.53
Forest Licences – nonreplaceable	111 382*	7.96
Timber Sale Licences, less than or equal to 10 000 m^3, replaceable	10 009	.72
SBFEP any category	157 407	11.25
SBFEP bid proposal	113 023	8.08
Forest Service Reserve	13 990	1.00
Woodlot licences	6 500	.46
Total	**1 399 000**	**100.0**

* includes a 25 000 cubic metre per year apportionment to the partition for deciduous-leading stands.

New AAC determination

Effective October 1, 2002 the new AAC for the Kingcome TSA will be 1 284 000 cubic metres.

This harvest level includes a partition of 20 340 cubic metres per year to deciduous-leading stands. This AAC excludes all volume issued to woodlot licences since the 1996 determination.

This AAC will remain in effect until a new AAC is determined, which may take place within five years of this determination.

I note that my July 2002 temporary AAC reduction under section 173 of the *Forest Act* remains in place following this section 8 determination, and therefore the reduction of 44 000 cubic metres also applies to this new AAC determination. The temporary reduction remains in place until such time as the Central Coast Designated Area ceases to be a designated area. Should the status of the area be changed to a permanent protection of the resources then I will consider revisiting this section 8 determination to account for the permanent exclusion of the area from contributing to timber supply.

Information sources used in the AAC determination

Information considered in determining the AAC for the Kingcome TSA include the following:

- *Kingcome TSA Data Package and Information Report*, BCFS, June 2000;

- *Kingcome TSA Analysis Report and Public Discussion Paper*, BCFS, November 2001;
- *Kingcome TSA Summary of Public Input on Data Package and TSA Analysis Report*, BCFS, September 2002;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including the AAC determination meeting held in Port McNeill, March 11 and 12, 2002;
- *Kingcome TSA Rationale for AAC determination*, BCFS, July, 1996;
- *Kingcome TSA Timber Supply Analysis*, BCFS, July 1995;
- *Kingcome TSA Socio-Economic Analysis*, BCFS, July 1995;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2002;
- *Forest Practices Code of British Columbia Act* Regulations and Amendments, current as of March 2002;
- Forest Practices Code of British Columbia Guidebooks, BCFS and MELP;
- *Site index adjustments for old-growth stands based on veteran trees.* Working Paper # 36, G. Nigh. BCFS Research Branch, Victoria, B.C., 1998;
- *Managing Visual Resources to Mitigate Impacts on Timber Supply in the Vancouver Forest Region: The Final Report (2nd Edition).* BCFS, Vancouver Forest Region, February 11, 1999;
- *Kingcome TSA Timber Availability Assessment.* Strathinnes Forestry Consultants Ltd., November 2000;
- Central Coast Land and Resource Management Plan, Phase I Framework Agreement, April 2001;
- *Coastal Watershed Assessment Procedure Guidebook (CWAP); Interior Watershed Assessment Procedure Guidebook (IWMP), Second Edition.* Province of British Columbia, Victoria, B.C., April 1999;
- *Forest Practices Code Timber Supply Analysis*, 1996;
- *Identified Wildlife Management Strategy*, February 1999;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Higher Level Plans: Policy and Procedures*, BCFS and MELP, December 1996.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—

such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Kingcome TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, in cases where projections of short-term timber supply are not stable, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine these AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and

forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Central Coast Land and Resource Management Plan (CCLRMP), Vancouver Island Land Use Plan (VILUP), Protected Areas Strategy, Land and Resource Management Planning (LRMP) or other area-based planning processes—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for regular AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

A number of intensive silviculture activities have been undertaken in the past that have the potential to affect timber supply, particularly in the long term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive

silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent decisions in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions. In this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the TSA or TFL. My determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

The British Columbia Court of Appeal decided in March 2002 that pending the final determination of the existence of aboriginal rights and title, the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the strength of the interests. I consider any information brought forward respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to seek to address such First Nations' interests. In this context, I re-iterate that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

If, subsequent to this determination, I become aware of information respecting First Nations interests that would substantially alter the estimate of timber supply underlying my determination, I am prepared to revisit my determination.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

The role of the timber supply analysis

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the timber supply review process.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Stand Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Base case forecast for the Kingcome TSA

The base case harvest forecast presented in the *November 2001 Kingcome Timber Supply Area Analysis Report* incorporated the most current available information on forest

management, land base and timber yields for the TSA. The forecast included specific assumptions about the TSA that are discussed in detail in the analysis report.

Given the specific assumptions applied, the analysis indicated that the then current AAC of 1 399 000 cubic metres (the AAC in place prior to my temporary reduction of July 2002) could not be achieved without causing disruptive harvest shortfalls in the future. In the base case, an initial harvest level of 1 319 000 cubic metres per year (5.7 percent lower than the pre-July AAC), could be maintained for one decade, after which the level declined by approximately 10 percent per decade for five decades to a mid-term harvest level of 740 455 cubic metres per year. The long-term harvest level of 973 000 cubic metres per year was reached after the tenth decade.

In the base case analysis, specific assumptions were made about the volume contributions to the initial harvest level originating from two distinct stand types, as follows: 15 340 cubic metres per year from red alder-leading stands; and 95 000 cubic metres per year from low-site, cedar-leading stands outside physical operability lines. The volume contribution from the red alder-leading stands was initially set at the level of current licence commitments, but declined over time as the available merchantable volume declined, reflecting that operationally red alder reforestation is limited to a maximum of 20 hectares per year.

Although there are current licence commitments from cottonwood stands in the TSA, no volume contribution from cottonwood stands was assumed in the base case. Cottonwood-leading stands were excluded in the derivation of the timber harvesting land base and instead the harvest levels possible from cottonwood-leading stands were assessed in a separate analysis. My considerations of the information are presented under the appropriate section of this rationale.

I note that in this rationale, I will discuss many of the analysis assumptions in the context of my considerations for this AAC determination. However, for some factors, my review of the assumptions has indicated that I am satisfied the factor was appropriately modelled in the base case of the timber supply analysis. In such cases I will not discuss my considerations in detail in this document, other than to note my agreement with the approach that is already documented in the timber supply analysis report. Some factors for which the assumptions were appropriately modelled in the analysis may warrant discussion, however, for other reasons, such as a high level of public input, lack of clarity in the analysis report, or concerns resulting from the previous determination for the Kingcome TSA. As a result, I may choose to provide my consideration of such factors in this rationale.

I am aware that the timber supply projections presented in the November 2001 timber supply analysis report differ substantively from those presented to me in 1996. In particular, the 2001 analysis projects a higher level of available timber supply in the short, mid and long term than was projected at the time of the 1996 analysis. I am advised by BCFS staff that the reasons for this variation are complex, but include the following:

- The area considered to be managed for visual objectives is now reduced to 23 percent of the timber harvesting land base, compared to 43 percent in the previous analysis. In both analyses, harvest levels were found to be sensitive to visual management constraints.

- In the current analysis, the regeneration periods are between 1 and 3 years less than those assumed in the 1996 timber supply analysis. This results in a reduced green-up period and a positive effect on timber supply compared to the 1996 analysis.
- The average productivity of sites on the timber harvesting land base is higher than in the previous analysis, since areas of poor site hemlock and areas with difficult access were excluded in this analysis.

Comparison between this and the previous analysis should be made with recognition of the extent and nature of these and other changes. My considerations of these factors and others relevant to the decision are discussed later in this rationale.

I am aware that there were specific considerations consistent with current timber supply review policies which led to the choice of the 2001 reference forecast. These considerations centred around the long-term stabilization of the growing stock on the timber harvesting land base. I have considered the reasoning used to select the base case harvest forecast and I am satisfied that the forecast selected presented the best approach to the stabilization of the growing stock. The alternative harvest forecasts that were considered are discussed later in this document.

I have also considered all public input received on the data package and analysis report, and where appropriate I discuss this input in my considerations under the various factors presented in this rationale.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(b) the rate of timber production that may be sustained on the area, taking into account

(ii) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social reasons. The deductions in the Kingcome TSA timber supply analysis resulted in a timber harvesting land base of 168 726 hectares, or approximately 29 percent of the productive forest area in the TSA.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Kingcome TSA. Those assumptions related to factors associated with the derivation of the timber harvesting land base for which, based on my thorough review, I accept the assumptions applied in the analysis, are not discussed below. These factors include the accounting in the analysis for non-merchantable forest types, roads, trails and landings, and timber licence reversions.

In addition, in this determination I will account for the exclusion of an additional 120 hectares that has been allocated in woodlot licences since the analysis was completed, in order to fully account for the separate administration of woodlot licence area from the area of the Kingcome TSA. I will discuss this further under 'Reasons for decision'.

I note that where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

- economic and physical operability

Those portions of the TSA which are neither physically operable nor economically feasible to harvest are categorized as inoperable, and are excluded when deriving the timber harvesting land base for the analysis.

District staff conducted the original operability mapping for the Kingcome TSA in 1993. In preparation for the 2001 timber supply analysis, a review of the 1993 operability lines was conducted by Strathinnes Forestry Consultants Ltd. with assistance from BCFS district and regional staff. This review included an examination of information from the following sources: forest development plans (FDPs) to determine development patterns and the location of current and planned harvesting; scaled volumes by species and year for timber harvested between 1992 and 1999; a helicopter overview of the TSA; and a quantitative Geographic Information Systems (GIS) analysis of available maps with forest cover, logged areas and slope classes for the TSA.

The results of this review were used to determine both the stands for exclusion as inoperable, as well as those stands for exclusion as low productivity sites. The latter reductions are discussed under *sites with low timber growing potential*.

District staff stratified the TSA land base into five operability zones, and developed assumptions to define the operable land base within each zone. The Klinaklini supply block was entirely excluded as inoperable. A total of 236 104 hectares were identified as inoperable, and excluded in the derivation of the timber harvesting land base.

District staff consider that the adjustments to the operability information are a reasonable estimate of the operable land base in the TSA. However, staff note that a mapping error resulted in the exclusion of approximately 300 hectares of accessible, poor site western redcedar and cypress stands near Chief Nollis Bay that should have been included in the timber harvesting land base.

Public input received from a forestry consultant expressed the opinion that too much area was excluded as inoperable, particularly for the chart areas of the Goletas and East Creek Forest Licences. The consultant submitted revised maps delineating the additional areas purported to be operable, totalling approximately 4300 hectares. However, district staff have reviewed the submitted information, and believe that the operability assumptions in the 2001 analysis for these areas were reasonable and reflective of current harvesting practices in the TSA.

Additional input from International Forest Products Ltd. requested that the operability of the Klinaklini supply block be re-examined. However, district staff indicate that this area was indeed reassessed during the 2000 land base review, and operations are still not considered feasible in the area.

I have considered the information about the operability assumptions in the analysis for the Kingcome TSA. I am satisfied that, for the most part, the best available information was used in the analysis, and that the assumptions are supported by current harvesting practices in the TSA. I accept that approximately 300 hectares of stands in the Chief Nollis Bay area should in fact be considered as part of the timber harvesting land base. However, given the small size of the area relative to the total timber harvesting land base, I will not explicitly make an adjustment in this determination.

- environmentally sensitive areas

Environmentally sensitive area (ESA) data—which identify areas sensitive to disturbance due to soil conditions, prone to avalanches, difficult to regenerate and/or with significant value for wildlife or recreation resources—were used to exclude areas in the derivation of the timber harvesting land base for the Kingcome TSA. ESA classifications of E1 (highly sensitive) or E2 (moderately sensitive) are used in timber supply analyses to exclude areas from the land base where more specific or detailed information is not available about a particular forest resource.

I have reviewed the exclusions applied to account for ESAs and I am satisfied that the assumptions in the analysis for areas of difficult regeneration and areas prone to avalanches were appropriate. As a result, I will not discuss my considerations in detail in this rationale. The exclusions applied for recreation and wildlife habitat values are discussed later in this rationale under the appropriate sections.

I believe that additional explanation is required with respect to the reductions applied to account for sensitive soils, and this is provided below.

Strategic level terrain mapping is not yet available for the entire Kingcome TSA, although some level C or D mapping has been completed by licensees for specific chart areas covering about 50 000 hectares of productive forest. ESA mapping of areas considered to be sensitive for soils is limited to those areas considered to be highly sensitive (Es1), and does not include an inventory of moderately sensitive areas (Es2). In the analysis, a combination of Es1 data and terrain stability mapping was used to identify and exclude unstable (highly sensitive) and moderately unstable (moderately sensitive) areas in the derivation of the timber harvesting land base.

District staff indicate that ground level reconnaissance of Es1 areas shows that some portions of the areas are stable, likely because of the broad nature of ESA mapping. Staff therefore assumed for the analysis that an 80 percent exclusion of Es1 areas was appropriate. A total of 1365 hectares were excluded specifically to account for Es1 areas, and a further 17 468 hectares excluded to account for other values were also classified as Es1.

Given that the original ESA inventory did not include an assessment of moderately sensitive areas, there has been ongoing uncertainty around the extent of moderately sensitive or unstable (Es2) areas in the Kingcome TSA. I requested in my last AAC rationale that further assessment be done to resolve the uncertainty. For the timber supply analysis, a GIS exercise was conducted in which the available terrain stability overview assessment data was overlaid with slope class data generated from TRIM mapping. District staff indicate that the terrain mapping used in this analysis represents a reasonable cross-

section of geographic locations and site types within the TSA. Using the information, staff developed correlations between areas of potentially unstable terrain and specific slope classes. The information was then extrapolated to the remainder of the TSA, resulting in the identification of 43 457 hectares of potentially unstable terrain. Given that approximately 20 percent of potentially unstable terrain is found to be unharvestable when assessed operationally, a 20 percent reduction percentage was applied to the areas.

Public input was received from the Sierra Club of BC on the exclusions applied in the analysis to account for unstable soils. The input stated that no harvesting should occur on unstable soils. In response, I note that the assumption that 80 percent of areas classified as Es1, or unstable, reflects that 20 percent of these areas are, in fact, found to be stable when assessed operationally. The assumption does not imply that 20 percent of areas that are unstable are harvested. Further, in response to both the Sierra Club of BC input and an individual submission suggesting the methodology to account for potentially unstable terrain was not sufficiently rigorous to prevent harvesting in unsuitable areas, I note that analysis assumptions are intended to reflect operations, and do not dictate what happens on the ground. Operational practices are guided by the provisions of the Forest Practices Code.

Having reviewed the information about the methodology used to estimate and exclude unstable and moderately unstable soils, I am satisfied that the methodology has provided a reasonable accounting for these areas in the Kingcome TSA, and I accept the information for use in this determination. I commend staff for their efforts to reduce the level of uncertainty in accounting for potentially unstable areas.

- deciduous forest types

Deciduous forest types are those dominated by broad-leaved, deciduous species. The two deciduous species considered to be merchantable in the Kingcome TSA are red alder and cottonwood.

The current AAC for the Kingcome TSA includes a 25 000 cubic metre per year partition for deciduous species, 20 000 cubic metres of which is currently apportioned to red alder and 5000 cubic metres of which is apportioned to cottonwood.

The analysis assumptions regarding these two species, and my consideration of these assumptions, are discussed below.

1) red alder

At the time of the previous determination for the Kingcome TSA, I requested that district staff attempt to better quantify the volume available in red alder stands prior to the next analysis. District staff initiated a study in December 2000 to address this issue. Using preliminary vegetation resources inventory (VRI) maps, staff identified and grouped red alder-leading stands into categories based on stand volume, age and site productivity.

Weyerhaeuser Company Limited currently holds a 20-year non-replaceable forest licence in the Kingcome TSA for the harvest of 15 325 cubic metres per year of alder. Under the terms of the licence, harvesting is restricted to those stands with more than 50 percent alder by volume. District staff also indicate that only stands with a total net merchantable volume of more than 300 cubic metres per hectare are typically harvested by the licensee.

To reflect this in the analysis, alder stands that did not meet these operational criteria were excluded in the derivation of the timber harvesting land base. Following exclusions, a total of 1077 hectares of red alder stands were considered to contribute to timber supply.

To examine red alder regeneration issues, an operational trial for red alder management has been implemented in the Vancouver Forest Region. As part of this trial, up to 20 hectares of red alder stands harvested may be regenerated back to red alder annually in the Kingcome TSA. The implications of this trial were also modelled in the base case, while the remainder of the alder area harvested was assumed to be regenerated to coniferous stands.

At the time the analysis was initiated, the licence commitment for red alder was 15 425 cubic metres per year. The volume contribution from red alder stands for the first decade was set at 15 340 cubic metres per year to reflect this commitment minus an allowance for non-recoverable losses. The analysis showed that this initial volume contribution could be maintained for one decade, after which it declined to 10 000 cubic metres per year. The available contribution continued to decline after the second decade, reaching zero in the fifth decade.

In a submission from Coast Mountain Hardwoods, concern was expressed at the longer term forest management implications of the regional strategy's limitations on the area to be reforested to red alder. Modelling of an alternative reforestation regime was suggested. However, district staff note that this alternative regime is not currently practiced in the TSA. As a result, it would be inappropriate to reflect it as current practice in the base case of the analysis.

However, the impact of assuming that 50 percent of harvested red alder-leading stands regenerate again to red alder-leading stands was tested in a sensitivity analysis. The sensitivity analysis utilized a different harvest flow policy than applied in the base case. The results of this sensitivity analysis, in which it was possible to maintain the level of the current commitment for one decade, showed that a long-term sustainable harvest level of 3000 cubic metres per year could be maintained for the entire analysis horizon.

Coast Mountain Hardwoods also expressed the opinion that more volume is available from red alder stands than was assumed in the analysis. However, district staff note that the land base review used to formulate the analysis assumptions indicated that fewer red alder stands are suitable for harvest than previously believed. Indeed, the land base review showed that the area of merchantable stands was between one-third and one-half of the area previously supposed. Overall, staff believe that the analysis assumptions realistically reflect the available and merchantable stand volume.

It is anticipated that the results of the operational trial will soon be available and any changes in operational practices that result can be reflected in the next timber supply review for the TSA. Having reviewed the information about the analysis assumptions for red alder, I am satisfied that the best available information was used and that current practice was appropriately reflected.

The volume currently apportioned to red alder-leading stands in the Kingcome TSA is 20 000 cubic metres per year. District staff note that there is very little additional volume beyond that set in the timber supply analysis to reflect the current licence commitment. From my review of the information, I also believe that there is no surplus volume beyond

that assumed in the base case of the analysis. I am satisfied that it is appropriate to continue a partition to deciduous-leading stands, but I will reduce the level of the partition to reflect the volumes in the current commitments, such as 15 340 cubic metres per year from red-alder leading stands. I will discuss this further under 'Reasons for decision'.

2) cottonwood

Cottonwood is also considered to be a merchantable species in the Kingcome TSA. Scott Paper holds a 15-year non-replaceable forest licence allowing for the harvest of 5000 cubic metres per year of cottonwood volume.

During the timber supply analysis, staff did not feel that the available BCFS inventory data was the best available information for assessing the merchantability of cottonwood stands. Therefore, in the base case, all cottonwood stands were excluded from contributing to timber supply. Instead, the availability of cottonwood volume was assessed separately using inventory information accumulated by Scott Paper. District staff indicate that the licensee's inventory data is considered to be the best available information.

In its 2002-2006 forest development plan (FDP), the licensee has identified a total of 60 000 cubic metres of available cottonwood volume within approved and proposed cut blocks. Approximately 46 000 cubic metres of this volume is located in the licensee's current operating area, and the remainder within an adjacent drainage. District staff have reviewed the information and believe that this estimate is the best assessment at the current time of the total available merchantable volume. Staff also indicate that the licensee's existing chart areas and proposed harvest areas contain adequate volume to sustain the existing cottonwood volume commitments of 5000 cubic metres per year for at least the next five years. Scott Paper's existing licence is due to expire at the end of March, 2004. District staff state that it is not yet known whether the licence may be extended for a further 5 years beyond that date.

I have considered the information about the cottonwood stands in the Kingcome TSA. I am satisfied from review of the information that there is an adequate cottonwood volume available to sustain the existing contribution to the AAC. For the current time, I am satisfied that it is appropriate to assume a 5000 cubic metre per year contribution to timber supply above what was assumed in the base case. I also consider it appropriate to continue the contribution from cottonwood stands to the deciduous partition. I will discuss this further under 'Reasons for decision'.

- sites with low timber growing potential

In order to delineate the timber harvesting land base for the timber supply analysis, sites with low productivity as a result of inherent site factors such as nutrient availability, exposure, excessive moisture, and sites that are not fully occupied by commercial tree species were excluded in the derivation of the timber harvesting land base.

In the analysis for the Kingcome TSA, data from the harvest profile analysis (discussed under *economic and physical operability*) were used to identify and exclude low productivity sites. The following sites were excluded: sites currently occupied by western redcedar-leading stands with net merchantable volumes of less than 350 cubic metres per hectare, or with an assigned site index of less than 12.7 metres; hemlock-, balsam-, spruce-

and Douglas-fir-leading stands with net merchantable volumes of less than 500 cubic metres per hectare (which correlated to assigned site indices of less than 13.8 metres for hemlock/balsam, 10.8 metres for spruce, and 20.2 metres for Douglas-fir).

Mill and Timber holds a non-replaceable forest licence in the TSA to harvest low site cedar stands. Staff delineated a low site zone located within the Hecate Lowlands area that generally correlated to the current chart areas associated with the licence. A separate harvest profile analysis was then conducted for this area as part of the operability review. This harvest profile analysis resulted in slightly modified criteria for these stands (a minimum volume of 340 cubic metres per hectare and minimum site index of 12.4 metres). Staff indicate that the slightly lower volume and site index factors used in the analysis to exclude sites with low timber growing potential in this area reflect the current harvesting performance of the licensee.

Stands that did not meet the criteria defined above were excluded in the derivation of the timber harvesting land base in the analysis. A total of 102 408 hectares were excluded on this account.

Input received from Mill and Timber expressed the opinion that the exclusions applied in the analysis to account for sites with low timber growing potential resulted in some harvestable stands excluded from the timber harvesting land base. Based on Mill and Timber's input, district staff estimated that approximately 700 hectares of additional low site area should have been included in the timber harvesting land base used in the timber supply analysis, most of which was located within map sheets where older forest inventory mapping was utilized. Low site timber harvesting opportunity was more accurately reflected on map sheets covered by the new vegetation resources inventory.

I have considered the information about the exclusions applied in the analysis to account for sites with low timber growing potential. I note that although the site index values used to define low productivity stands seem reasonable, the minimum volume requirements appear to be high in comparison to those used in the timber supply analyses for other coastal units. I also note that the criteria used to exclude low productivity stands from the timber harvesting land base resulted in the exclusion of some very old stands that met the minimum volume criteria but were below the minimum site index value. Staff advise me that including these stands, given the methodology taken to define economic and physical operability in certain areas of the TSA, could increase the timber harvesting land base by as much as twenty percent and that the merchantability of many of these old, low-site stands was highly questionable.

Given BCFS staff concerns regarding the merchantability of low volume and low productivity stands and that the criteria used to define these types in the base case were derived through a detailed harvest profile analysis for the TSA, I accept that the assumptions in the base case reasonably reflect current practice in the Kingcome TSA, and I make no adjustments in this determination on this account. However, I recommend that district staff continue to review and refine the criteria used to identify low productivity stands in preparation for the next determination.

I will, in this determination, take into account that the timber harvesting land base has been underestimated by 700 hectares as discussed above, and I will discuss this further under 'Reasons for decision'.

- low site partition

The 1996 AAC determination included a partition of 130 000 cubic metres to the harvesting of low productivity redcedar and cypress stands located in areas that had been classified as "931L" in the old forest inventory. District staff indicate that there has been general compliance by licensees with the partition, and in fact some level of performance by all licensees in the marginal stands. However, staff believe that for the licensees other than Mill and Timber for their low productivity site licence, the compliance with the partition reflects normal operational planning rather than a specific focus on low site partition stands. District staff recommend that the partition to low productivity sites not be included in this AAC determination.

In the timber supply analysis, a contribution was tracked separately from specific stands to emulate the harvest operations in these stands. Cypress and western redcedar stands that were located within the Nahwitti-Hecate lowlands portion of the TSA, beyond previously identified operability lines and that met the minimum low site criteria for that area as described above, were grouped into a 'low site partition' category and assumed to contribute to the low site harvest level in the analysis. In the base case, a harvest contribution of 95 000 cubic metres per year was assumed to come from these stands. This level was maintained for the first decade, after which it declined by 25 percent for three decades, eventually reaching zero after 50 years.

I have considered the information about the low site partition in the Kingcome TSA and discussed the partition with district staff. I am satisfied that the partition is no longer required in this determination, and I will discuss this further under 'Reasons for decision'.

- protected areas

All existing parks and protected areas in the Kingcome TSA, including those designated under the Vancouver Island Land Use Plan (VILUP), were excluded in the derivation of the timber harvesting land base in the analysis.

The Central Coast Land and Resource Management Plan (CCLRMP), encompasses approximately 80 percent of the Kingcome TSA. The planning process was initiated in 1997 and government endorsed a Framework Agreement in 2001. The Framework Agreement included recommendations for the establishment of several interim land use zones, including proposed protection areas, option areas and special management zones for visual quality. My considerations of the components of the CCLRMP are further discussed later in this document under *visually sensitive areas* and Land Use Planning.

For this determination, with respect to existing protected areas, I am satisfied that the accounting in the analysis was appropriate.

Existing forest inventory

The original forest cover inventory for the Kingcome TSA was collected between 1966 and 1974. An audit was conducted in 1995 on this inventory which assessed, among other things, the mature component of the inventory, evaluating differences between the existing inventory's estimate of mean mature volume per hectare for the TSA and a new estimate obtained from the audit samples. The inventory audit suggested that existing stand

volumes derived from the inventory file data for the Kingcome TSA were overestimated by 11 percent for stands on the total forested land base and 18 percent for stands on the operable land base. The implications of these audit results will be discussed under *volume estimates for existing stands*.

Phase 1 of a new vegetation resources inventory (VRI) was initiated in 1996 for the TSA. The VRI was expected to be completed for the entire TSA in time for the next timber supply analysis. VRI phase 1 involves classification of forest/vegetation polygons, and does not include volume sampling nor development of local yield adjustments which are normally done under phase 2 of the VRI. For a number of reasons, phase 1 of the VRI was not completed for the entire TSA. However, it was completed for an area that covers about 75 percent of the timber harvesting land base of the TSA.

In the 2001 timber supply analysis, the VRI data was used for that portion of the TSA for which it was available. The older forest cover inventory data was used for those portions of the TSA lacking VRI coverage. For the analysis, the VRI and forest cover data were updated to August 1999 for depletions, such as harvesting and fire. The attributes in both files were projected to February 2001 for forest growth.

I am satisfied that the combination of available VRI data and older forest cover inventory data represent the best available information. I accept this information for use in the analysis, subject to my considerations discussed in the next section of this rationale, as follows.

- volume estimates for existing stands

Volumes for existing natural stands (in which species and stocking have not been managed) were estimated and projected using the VRI forest inventory attributes and the Variable Density Yield Prediction (VDYP) model which was developed by the former BCFS Resources Inventory Branch (now the Terrestrial Information Branch in the Ministry of Sustainable Resources Management).

In the analysis, all existing coniferous stands over 30 years of age, 88 percent of coniferous stands 21 to 30 years of age, 64 percent of coniferous stands 11 to 20 years of age and all deciduous stands were assumed to be unmanaged, and the volumes for these stands were estimated using VDYP. The volume of all coniferous-leading stands regenerated after harvesting were estimated using managed stand yield tables.

As mentioned previously, the 1995 inventory audit of the older forest cover inventory data, indicated the possibility of an 11 percent overestimation in the volume estimates for stands on the total forested land base, and an 18 percent overestimation in the volume estimates for stands on the operable land base. The audit indicated that most of the overestimation was associated with the inventory attribute estimates, that is, the stand age and height data. Staff note that the operable land base used for the inventory audit was based upon older operability information, and the assumptions may not correlate well to the operable land base assumed for the 2001 analysis.

In the timber supply analysis, existing volumes for stands on 25 percent of the timber harvesting land base were projected using the older forest cover inventory data. The inventory file attributes were not adjusted in the analysis for that portion of the land base because the 1995 audit was applicable to the TSA as a whole, and not specifically to the

portion of the TSA for which the older data was used in the analysis. In fact, very few of the audit plots on the operable forested land base were located in the portion of the TSA still covered by the older forest cover inventory data.

For the portion of the TSA covered by the VRI data, no phase 2 sampling nor any audit data were available to assess the accuracy of the volume estimates. However, stand volume estimates were compared for 79 mapsheets for which both VRI and older forest cover inventory data were available. The comparison showed that mature stand volumes estimated using the VRI data were approximately 11 percent lower compared to those estimated using the older forest cover data.

Sensitivity analysis was conducted which evaluated the timber supply impacts of assuming the volumes of all existing stands were overestimated by 10 percent. The results indicate that short-term timber supply would decrease by 10.1 percent compared to the base case. However, given that the size of the area for which there is uncertainty about stand volumes is only 25 percent of the timber harvesting land base, the results of this sensitivity analysis overstates the potential timber supply implications.

Staff conducted separate analysis to attempt to estimate the timber supply impacts of adjusting the stand volume estimates in the older forest cover data. Although 25 percent of the timber harvesting land base falls within the area covered by the older data, the stands in this portion of the TSA comprise only 21 percent of the merchantable growing stock. If volumes for only these stands were overestimated by 10 percent, the merchantable growing stock in the TSA would be overestimated by 2.1 percent in the analysis.

Having considered the information used to estimate existing stand volumes, I am satisfied that the VRI data has addressed the uncertainty around volume estimates for that portion of the land base for which the newer data was available. For the remainder of the timber harvesting land base, I am aware that the information indicates a likely overestimation in the volumes for existing stands, as they were calculated using the older forest cover inventory data. From my review of the information, I note that this overestimation of stand volumes could be interpreted to range between the 11 and 18 percent values noted in the inventory audit for the total forested, and operable land bases, respectively. However, given that only two of the audit samples on the operable land base fell within the area covered by the older inventory data, it is not possible to determine whether any of the overestimation actually pertains to the land base in question. It is entirely possible that the bias in the inventory attributes was present fully outside the land base still covered by the older inventory, and therefore that in reality the VRI data has wholly addressed the concern. In consideration of all of this information, I believe it is possible to conclude only that the existing stand volumes for the area *may* have been overestimated, and consequently that this overestimation ranges between 0 and 18 percent.

I am aware that there is not enough information at this time to precisely determine where the overestimation exists within this range of uncertainty. In the absence of better information, I will apply my judgement and accept that existing stand volumes for that portion of the land base have been overestimated by about 9 percent. Given that the stands in question represent 21 percent of the merchantable growing stock, this indicates that timber supply has been overestimated by approximately 2 percent. This affects short- to mid-term timber supply, as existing natural stands comprise the majority of those harvested

for the first six decades of the analysis horizon. I will discuss my considerations of this further under 'Reasons for decision'.

Expected rate of growth

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e. less than 31 years old), and older stands (i.e. over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well as results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory file data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

No local site index studies have been conducted in the Kingcome TSA. According to the inventory, stands growing on good sites comprise 26 percent of the timber harvesting land base, stands on medium sites cover 40 percent of the timber harvesting land base and stands on poor sites cover 34 percent of the timber harvesting land base. Sensitivity analysis was used to examine the timber supply implications if the site index adjustments suggested by the provincial OGSI studies were appropriate for the stands in the Kingcome TSA.

In the sensitivity analysis, site indices of western redcedar- and hemlock-leading stands older than 140 years and with assigned site indices within the range sampled were adjusted using the results of the study *Site index adjustments for old-growth stands based on veteran trees*. Managed stand volume estimates, green-up ages and minimum harvestable ages for those analysis units affected by changes in estimated future productivity were recalculated based on the average adjusted site productivity.

The sensitivity analysis results indicate that if site productivity is underestimated to the extent suggested by the OGSI studies, the mid-term harvest level could increase to 925 000 cubic metres per year, a level approximately 25 percent higher than that in the base case. The long-term harvest level achievable was 1 182 400 cubic metres per year, or approximately 21 percent above the level in the base case. In each instance, the harvest level was unaffected for the first four decades of the analysis horizon.

I acknowledge that some uncertainty exists with respect to the ultimate performance of second growth stands relative to their potential. However, data from the paired-plot study clearly demonstrates that regenerated stands are growing at a much faster rate than would be expected based on measurements from the standing old growth inventory. Given existing silvicultural requirements, it is reasonable to expect that full stocking will occur in the majority of managed stands, and that the stands will be managed to minimize losses to pests and competing vegetation. Therefore, while the exact magnitude of the productivity increase is not certain, I believe it is highly reasonable to expect that most second-growth stands will grow more quickly than productivity estimates from old-growth stands would suggest.

In consideration of the information on site productivity, I expect that it is likely that the mid- to long-term levels are indeed greater than those shown in the base case. However, until local studies are conducted in the TSA, it is difficult to determine to what extent the results shown by the sensitivity analysis may be possible for the Kingcome TSA. I will take into account in this determination that mid- to long-term timber supply has been underestimated by an amount of between 0 and 21 percent, and I will discuss this further under 'Reasons for decision'.

- volume estimates for regenerated stands

To estimate volumes for managed stands, the BCFS uses the Table Interpolation Program for Stand Yields (TIPSY), developed by the BCFS Research Branch. In the analysis for the Kingcome TSA, managed stands were defined as all existing stands less than 11 years of age, 36 percent of existing stands 11 to 20 years of age, 12 percent of existing stands 21 to 30 years of age and all stands regenerated after future harvesting.

TIPSY projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition in the stand. Operational adjustment factors (OAFs) are applied to account for small stocking gaps in stands (OAF1), as well as for age-dependent factors such as pests, disease, decay, waste and breakage (OAF2). In the BCFS analysis, the provincial standard reductions of 15 percent for OAF1 and 5 percent for OAF2 were applied.

The Forest Practices Code requires the use of the best genetic quality (seed and vegetative material) source available for regeneration. Select seed produced from seed orchards is the product of B.C.'s forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees. Select seed from seed orchards produces trees that grow faster than those from unselected, natural stand seed. As a result, a stand composed of such trees has a greater volume at the same age than a natural stand with the same species composition. Current expectations are that the volume differences will begin to decrease beyond a certain stand age. Operationally in the Kingcome TSA, select seed is used for regeneration where it is available.

In the base case, no volume gains were assumed from the use of class A seed. Instead, the timber supply impact of the current level of use of improved seed was examined in a sensitivity analysis. The results indicated that the long-term harvest level could be 3.3 percent higher than in the base case forecast, although the short-term harvest level was unaffected.

Input from International Forest Products Ltd. noted that the use of genetically improved seed should be accounted for in the base case, and suggested that short-term timber supply increases could be possible if green-up ages and minimum harvestable ages were limiting to timber supply. However, staff advise me that short-term timber supply is primarily limited by a shortage of available growing stock. As shown in the sensitivity analysis, the effect of the use of class A seed influences mid- to long-term timber supply.

I have considered the information regarding the assumptions applied for the estimation of managed stand volumes in the analysis, and I am satisfied that they result in a reasonable estimation of stand yields. With respect to the assumptions around the use of class A seed, I am satisfied that it is appropriate to take into account the current level of use of class A seed in the TSA. I accept that long-term timber supply has been underestimated by up to 3.3 percent on this account, and I will discuss this further under 'Reasons for decision'.

- minimum harvestable ages

A minimum harvestable age is an estimate of the earliest age at which a forest stand has met minimum merchantability criteria. The minimum harvestable age assumption largely affects when second growth stands will be available for harvest. This in turn affects how quickly existing stands may be harvested such that a stable flow of timber harvest may be maintained. In practice, many forest stands are harvested beyond the minimum harvestable age due to economic considerations and constraints on harvesting which arise from managing for other forest values such as visual quality, wildlife and water quality.

In the analysis for the Kingcome TSA, the minimum harvestable age for each stand was set to the greater of the following:

- The age at which the stand was predicted to reach a minimum required volume (350 cubic metres per hectare for western redcedar-leading stands; 500 cubic metres per hectare for other coniferous stands, and 300 cubic metres per hectare for red alder-leading stands); or
- The age at which the stand was predicted to achieve a mean annual increment (MAI) that was 95 percent of the maximum MAI.

The resulting minimum harvestable ages ranged from 55 years for hemlock and balsam stands regenerated on good sites, to 150 years for existing western redcedar-leading stands on poor sites. The ages were 50 years for red alder-leading stands. Approximately 53 percent of existing stands on the timber harvesting land base are currently at or above minimum harvestable age.

Sensitivity analysis was conducted to assess the timber supply implications of assuming either younger or older minimum harvestable ages than those assumed in the base case. The analysis results indicate that if minimum harvestable ages were decreased by 5 years, the short-term harvest level could be increased by 2 percent. If minimum harvestable ages were increased by 5 years, short-term timber supply was decreased by 2.5 percent. In each case, the new short-term harvest level was maintained for one decade, before the level returned to the level indicated in the base case.

Having reviewed the assumptions about minimum harvestable ages, I note that the criteria are reasonable and reflect those typically used to define ages for the purposes of timber supply analysis. However, upon reviewing the sensitivity analysis results, I am mindful

that timber supply in the Kingcome TSA demonstrates a fair level of sensitivity to uncertainty around the ages. More explicitly, I note that minimum harvestable age is one of the factors influencing the lower short-term harvest level projected in the base case, compared to the pre-July 2002 AAC for the TSA. As I have often stated in rationales for AAC determinations for other TSAs in the province, minimum harvestable ages are subject to a fair degree of uncertainty given the highly qualitative nature of the criteria and the difficulty associated with predicting future harvest and merchantability objectives.

It is thus difficult to ascertain whether the ages assumed in the analysis may over-represent minimum ages required for future operations. Although minimum harvestable ages primarily define future harvest objectives rather than those for existing stands, staff note that the actual minimum volumes (and corresponding ages) directing harvest of existing stands in the TSA are greater than the minimums assumed in the analysis. Stands are harvested with higher volumes, and at ages far greater than the assigned minimum harvestable ages.

From reviewing the information and discussing the assumptions and current practices with district staff, I believe there is no indication that minimum harvestable ages have in fact been overestimated for the analysis. I will make no adjustments in this regard for this determination, although I request that staff continue to monitor the criteria and make any revisions for the next analysis for the TSA.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

I have reviewed the information regarding impediments to prompt regeneration and not-satisfactorily-restocked areas, and I am satisfied that the assumptions in the analysis for these factors were appropriate. As a result, I will not discuss my considerations in detail in this rationale.

- regeneration delay

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In timber supply analysis, regeneration delay is used to determine the starting point of tree growth for the yield curves which project volumes over time.

In the analysis for the Kingcome TSA, assumptions employed in the growth and yield and forest-level modelling reflected that the majority of regenerated forests would be established within three years of harvest. For western redcedar stands on good sites, and spruce stands, it was assumed that reforestation would occur within 2 years. For alder stands, a 4 year regeneration delay was assumed and for western hemlock stands on poor sites, a 5 year regeneration delay was assumed.

The regeneration delays assumed in the analysis were revised from those proposed in the data package, following identification of a reporting error by district staff which had resulted in overly long regeneration delays. The reporting error was corrected, and data from the integrated silvicultural information system (ISIS) and major licensee silvicultural

information system (MLSIS) were used to estimate the delays assumed in the analysis. However, staff note that this data primarily reflected silvicultural practices on cutblocks harvested prior to 1998, and in some cases reflect the delays practiced prior to implementation of the Forest Practices Code. Staff indicate that current practices now include more prompt reforestation of harvested sites, and as a result, that the analysis assumptions still slightly overestimate some of the delays observed operationally. Specifically, for hemlock stands growing on poor sites, staff believe that the regeneration delay should be reduced from 5 years to 3 years, and the delay for red alder stands should be reduced from 4 years to 2 years.

Staff evaluated the impact of reducing regeneration delays for hemlock stands on poor sites as well as for alder stands, by two years in each case. Sensitivity analysis results indicate that reducing the delay for these two groups of stands to reflect what is occurring operationally would increase the short-term timber supply by approximately 0.5 percent in both the short and long terms. The impact is primarily as a result of reducing the regeneration delay for the hemlock stands; reducing the regeneration delay for red alder sites has a negligible impact on timber supply due to the small amount of area reforested annually with red alder.

Having considered the information about the analysis assumptions for regeneration delays, I believe it is appropriate to take into account the timber supply implications of assuming delays that more accurately reflect current operational practices. I will take into account in this determination the impacts to short- and long-term timber supply suggested by the sensitivity analysis, and I will discuss this further under 'Reasons for decision'.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

I have considered the information regarding incremental silviculture activities and rehabilitation programs and I am satisfied that the analysis assumptions were appropriate. As a result I will not discuss my considerations of this information in detail in this rationale.

- silvicultural systems

The majority of the harvesting in the Kingcome TSA has been done through the use of even-aged silvicultural systems. Over the past five years, most cutblocks harvested in the TSA have utilized the clearcut with reserve silvicultural system, with the reserve area in the cutblock serving as wildlife tree patches to provide for stand level biodiversity.

Historically there has been little use of retention silvicultural systems in the TSA. However, several licensees in the TSA have recently committed publicly to use retention silvicultural systems on some or all of their operating areas.

Operationally, staff note that the size and distribution of areas retained in cutblocks that have been harvested using retention silvicultural systems are extremely variable. It is difficult to assess the amount of area retained beyond wildlife tree patch requirements, as many licensees have not distinctly described the two types of reserves in operational plans.

In the timber supply analysis, the majority of the timber harvesting land base was assumed to be harvested using clearcut silvicultural systems. Although the data package indicated that an additional 10 percent retention would be modelled (beyond the retention assumed for wildlife tree patches (WTPs)), this assumption was not used in the base case because it was believed retention systems were resulting in little retention beyond the WTP requirements already reflected in the analysis.

In late 2001, district staff initiated a review of 50 silvicultural prescriptions (SPs) from blocks harvested between 1999 and 2001 to better assess the impacts of the use of retention silvicultural systems. The results of the review indicated that operationally, there is indeed additional retention beyond that employed strictly for WTPs. Staff believe that the incremental retention could be up to an additional 2.9 percent on 26 percent of the timber harvesting land base. However, within this estimate, staff indicate there are potential overlaps with other areas excluded in the derivation of the timber harvesting land base, such as for riparian habitat, terrain stability, etc. Staff also note that the blocks reviewed in this study reflected the early implementation of retention, and that the implications of the future implementation of this silvicultural system may vary from the impact of what was reviewed. Staff believe that the retention practiced over time will be somewhat greater than the impact observed in the study, but note that it is not yet possible to estimate the level of retention with certainty.

Having considered the information presented, I am satisfied that the additional impact observed in the study represents current practice for the use of retention silvicultural systems. I believe it is quite likely, given the ongoing implementation of these systems on an increasing portion of the timber harvesting land base, that the impact will become greater over time. However, I am mindful that the quantified impact indicated by the study may contain a degree of overlap with other factors already accounted for in the analysis, which would imply that the 0.75 percent impact may in fact be at the upper end of the range. Considering the extent of the information available, and the corresponding uncertainty around the exact level of impact, I accept for this determination, that timber supply has been overestimated by 0.75 percent on this account. I will discuss my considerations of this further under 'Reasons for decision'.

I request that district staff continue to monitor the implementation of retention silvicultural systems, such that any new information can be incorporated into the next timber supply review for the Kingcome TSA.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber harvesting

I have reviewed the information regarding the utilization standards assumed in the analysis for the Kingcome TSA, and I am satisfied that these factors were appropriately reflected in the analysis.

- decay, waste and breakage

Natural stand yield estimates used in the analysis reflect an accounting for volumes lost to decay, waste and breakage. The VDYP model, which is used to project volume for existing stands, incorporates estimates of volume of wood lost to decay, waste and breakage. Decay losses are built into the volume estimates, while standard waste and breakage factors are incorporated into the analysis when developing VDYP yield curves. These estimates of losses have been developed for different areas of the province based on field samples.

District staff express uncertainty about the applicability of the standard decay, waste and breakage estimates to some of the stands in the Kingcome TSA. In particular, the decay, waste and breakage factors for yellow cedar (cypress) stands in the Hecate Lowlands area are known to be underestimated. Staff indicate that one of the licensees in that area has obtained approval to apply additional factors to operational cruise volumes to account for the discrepancy.

The timber supply analysis did not incorporate any adjustments to account for the additional decay in this area. Staff note that the issue is localized to a relatively small portion of the TSA. The factors applied in the analysis were derived based on sampling from the Forest Inventory Zone (FIZ) that covered the entire TSA and, therefore, it is possible that local variations, such as that in this small area, were balanced by data from elsewhere in the TSA.

Staff indicate that, apart from this concern around the loss factors for cypress, there are no issues with loss factors in the remainder of the Kingcome TSA.

I have considered the information about the decay, waste and breakage factors used in the analysis. I am satisfied that the data used to compile the more standardized factors used in the analysis has likely accounted for any local variations such as the one identified, due to the inclusion of data from a variety of different areas within the TSA. As a result, I accept that the decay, waste and breakage factors used in the analysis were adequate for this determination, and I make no adjustments on this account.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

I have reviewed the information presented to me regarding the analysis assumptions for community watersheds and stand level biodiversity, and I am satisfied that the analysis has appropriately reflected the values and operational constraints for these factors. As a result, I will not discuss my considerations of these factors in detail in this rationale.

- adjacency and green-up

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

The FSSIM timber supply analysis model does not represent the adjacency constraints explicitly. Rather, constraints are modelled implicitly by limiting the amount of area on which stands may be below a specified green-up height. In the timber supply analysis, management zones were developed for known scenic areas and other visually sensitive areas, areas that fall under the Vancouver Island Land Use Plan (VILUP), and areas subject to the general IRM constraints. Specific constraints were developed and applied to each management zone to emulate current practices.

Approximately 59 percent of the timber harvesting land base in the Kingcome TSA lies within the IRM zone. A further 9 percent of the timber harvesting land base is within the Enhanced Forestry Zone (EFZ) described under the VILUP. Within both the IRM and EFZ areas, a forest cover constraint was applied, whereby no more than 25 percent of the stands within each landscape unit were permitted to be below green-up height at any one time in the base case. A 3 metre green-up height was assumed for areas within the IRM zone. A green-up height of 1.3 metres was applied to the areas within the EFZ to reflect the provisions of the VILUP higher level plan.

The VILUP higher level plan also limits clearcut size to 5 hectares and retention cutblock sizes to 40 hectares within areas described as Special Management Zones (SMZs), in order to manage for the visual resource as well as other non-timber values. These requirements were not specifically modelled in the timber supply analysis, as they were believed to be adequately addressed through the application of the more generalized visual management constraints (as discussed under *visually sensitive areas*). All of the SMZs in the TSA contain known scenic areas.

The ages that corresponded to green-up heights were estimated for each analysis unit and within each landscape unit using average site indices. Green-up ages ranged between 10 and 16 years for stands in the IRM zone, and between 7 and 9 years for stands in the EFZ.

District staff indicate that the green-up ages assumed for stands in the IRM zone are reflective of current practice. However, recent discussions with licensees operating in stands in the EFZ indicate that the lower standard for green-up has not been applied to date, and only limited application is anticipated during the next 2 to 3 year period. As a result, district staff believe that the green-up assumptions for the EFZ areas in the base case are not reflective of current practice, and in reality the same 3 metre green-up height applied to the IRM zone would be more appropriate for the stands in the EFZ areas as well. Increasing the green-up height to 3 metres correlated to a 3 to 7 year increase in green-up age for the various analysis units.

As part of the timber supply analysis, sensitivity analysis was conducted that evaluated the impact of changes to green-up parameters for stands in the IRM and EFZ areas. A five-year reduction in green-up ages for stands over the entire area resulted in a 1.1 percent increase

in short-term timber supply. A five-year increase in green-up ages resulted in a 12.1 percent decrease in the short-term harvest level compared to that of the base case. However, since the EFZ area makes up only about 9 percent of the timber harvesting land base, this impact is in excess of what would be expected if the green-up height for only those stands in the EFZ area was increased to 3 metres. To more precisely estimate the impact, an additional sensitivity analysis was conducted in which the standard 3 metre green-up height was applied to the EFZ areas as well as the IRM areas. The results indicate that a reduced rate of harvest would be required in EFZ areas, but there would be little impact to the overall timber supply for the TSA, as the harvest could be accommodated by shifting to stands in other areas.

International Forest Products expressed concern about the impact of green-up constraints on timber flows. The licensee indicates that work needs to be completed to improve the information on the relationship between standing inventory and short-term timber availability, and noted that it has commenced a total chance planning project to examine this issue. The licensee states that preliminary results from its project indicate that although the standing inventory will support the AAC in a non-spatial manner over the entire TSA, the availability of economic timber is constrained by stand value, spatial distribution and regulatory constraints in a manner that does not seem to be reflected by the analysis.

I have reviewed this input, and note that much uncertainty remains about the timber supply impacts of spatial restrictions on forest operations. Study undertaken by the BCFS has shown that the results of analysis that explicitly models spatial restrictions such as cutblock adjacency depend highly on data preparation and formulation of the constraints. There is always some uncertainty about whether a model accurately represents actual operations. For example, it may be possible to mitigate impacts suggested by an analysis through careful operational design, alternative approaches to achieving the underlying objectives, or construction of new roads or bridges that provide access to areas that appear unavailable in the short term. However, I recognize the possibility that the Kingcome TSA analysis may not fully represent some factors that may limit timber availability. District staff have indicated that adjacency and green-up constraints are in some cases limiting the ability of licensees to access higher value stands to meet specific harvest profiles. However, if a desired harvest profile had been used as an input to the analysis, an impact on timber supply may have been shown. I cannot be certain that the impact suggested by district staff stems from the profile objective, or from spatial restrictions on harvest. Therefore, at this time, the potential timber supply impacts of spatial restrictions beyond those modelled in the base case are unknown and have not been quantified.

I encourage the licensee to continue developing a total chance plan in order to help quantify the impacts, if any, of harvest restrictions that affect the economics of timber supply. However, given the uncertainty about whether there is an additional impact, and about the magnitude of any impact, I will not make any adjustments at this time. Any additional information which becomes available over the term of this determination can be incorporated into the next timber supply analysis.

Having considered the information about the analysis assumptions around adjacency and green-up, I make the following observations.

I note that the forest cover constraint best applied to areas within an IRM zone to reflect operational practices is difficult to quantify with certainty. In the analysis for the Kingcome TSA, it was assumed that only 25 percent of the stands on the timber harvesting land base could be below green-up height at any time, an assumption that is relatively constraining, and the constraint is not driven by any particular requirements arising from the VILUP. Typically, estimates of this allowable disturbance vary between 25 and 33 percent and I generally look for some evidence or reasonable argument to support the selection of either value. BCFS staff advise me that the assumptions in the analysis were believed to be most reflective of operational constraints, and in particular reflect the fact that adjacency is indeed constraining operations in the TSA, as noted by the licensee input above. However, as also discussed above, I am not convinced that the issue is indeed one of adjacency, and I am more of the belief that the issues around location of harvestable timber is one of economics than of adjacency. I believe that short-term market conditions are by far the largest determining factor in this instance.

Sensitivity analysis results indicate that short-term timber supply could be increased by about 1 percent above the level in the base case, if it were appropriate to assume 33 percent of the stands on the timber harvesting land base could be below green-up height at one time.

In consideration of the available information, I acknowledge that there is uncertainty about whether the adjacency constraints for the IRM and EFZ areas are best reflected by assuming that either 25 or 33 percent of the stands on the timber harvesting land base may be below green-up height at one time. Accounting for this uncertainty implies an impact in the range of between 0 and 1 percent, and I will take this into account as discussed under 'Reasons for decision'.

With respect to green-up height, I am satisfied that it is appropriate to take into account in this determination the implications of a somewhat higher green-up height for the stands in the EFZ areas than that assumed in the analysis. However, results of sensitivity analysis indicate that timber supply is not affected by variations of this magnitude for these areas. I request that district staff continue to monitor operations in stands in the EFZ areas. I also ask for further review at the time of the next analysis, such that any refinements in the information can be reflected in a future timber supply analysis. For this determination, I make no adjustments on this account.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known by the district manager or through a higher level plan, and by providing for the establishment of visual quality objectives (VQOs). A visual landscape inventory identifies, classifies and records visually sensitive areas within a landscape. Using such an inventory, recommended visual quality classes (rVQCs) of preservation, retention, partial retention or modification may be derived to guide operational practices. These recommended VQCs may become VQOs established by the district manager or through a higher level plan.

In the Kingcome TSA, the district manager has made scenic areas known under the Forest Practices Code. Visual landscapes within some of the more remote, less frequently visited portions of the TSA were not made known as scenic areas, in an effort to mitigate the impact of visual management on timber supply under the *1998 Strategy for Managing Visual Resources to Mitigate Impacts on the Timber Supply* in the Vancouver Forest Region. The mitigation strategy was initiated subsequent to the implementation of the Forest Practices Code, in order to account for the improved management practices resulting from the Code.

Known scenic areas currently cover about 23 percent of the timber harvesting land base in the TSA. At the time of the previous determination for the Kingcome TSA, about 43 percent of the timber harvesting land base was under management for visuals.

To achieve objectives for visual quality, limits are placed on the amount of visible disturbance that is acceptable in visually sensitive areas. Guidelines to meet VQOs include setting a maximum percentage of a visual landscape allowed to be in a disturbed state at any one time, and setting visually effective green-up (VEG) targets that must be achieved before additional harvesting is permitted. VEG refers to the stage at which a reforested area is perceived by the public to be satisfactorily greened-up from a visual standpoint. The visually effective green-up height for the stands in the Kingcome TSA was assumed to be 5 metres. District staff indicate that the height may vary operationally depending on a variety of site-specific factors, but believe that the height assumed in the analysis was a reasonable average height for the achievement of visually effective green-up.

VQOs have not yet been established in the TSA, but the licensees voluntarily comply with recommended VQCs in operational practice. Specific management for visuals is not currently required outside of known scenic areas, but licensees are encouraged to follow basic landscape design principles for cutblocks that are visible from viewpoints.

In the base case, visual management constraints were applied to the productive forest landbase within the known scenic area. The restrictions for percent permissible disturbance and green-up requirements were applied to the productive forest land base because disturbance restrictions in visual areas apply to the entire viewscape regardless of operability. Staff followed the methodology described in the document *Procedures for Factoring Visual Resources into Timber Supply Analyses*, and applied the visual absorption capacity (VAC) from the landscape inventory to determine the maximum percent alteration to be applied within each rVQC. The calculation was performed separately for each landscape unit (LU) to better reflect the variations in landforms and topography that occur in different parts of the Kingcome TSA.

District staff compared the derived area-weighted average value for each rVQC to the ranges in the guidebook, and note that the derived value for each LU was generally very close to the mid-point of the permissible range for each class. Overall, staff believe that the constraints modelled in the base case are reflective of current practices for visual management within the scenic areas of the TSA.

A sensitivity analysis was conducted to test the impact of managing for visual quality over the entire area covered by the visual landscape inventory, as opposed to only within the known scenic areas. The results showed that application of visual restrictions to the entire inventoried area caused a 5.1 percent reduction in the short-term harvest level.

An additional sensitivity analysis examined the effect of applying the upper and lower values of the denudation range for maximum allowable disturbance for each rVQC within the known scenic area. Application of the higher value for allowable disturbance resulted in a 5 percent increase in the short-term timber supply, whereas application of the lower value for allowable disturbance resulted in a 10.8 percent decrease in short-term timber supply.

The VILUP higher level plan contains provisions for scenic management within special management zones (SMZs) on Vancouver Island. Four of these SMZs are wholly or partly located within the Kingcome TSA. These SMZs are within the known scenic area, and district staff indicate that the constraints modelled as part of the base case for the scenic areas reflect the provisions of the higher level plan.

Under the April 2001 CCLRMP Framework Agreement, portions of the Kingcome TSA are delineated within SMZs for visual quality. The SMZs under the CCLRMP identify high priority visual areas, and were established specifically to address visual management issues related to forest development. The framework agreement for the CCLRMP outlines a process for developing visual quality objectives and appropriate management practices for the SMZs, and a subcommittee of the CCLRMP planning table is tasked to develop recommended VQOs for these areas, using existing landscape inventory information and collaborative field studies. Each of the SMZs is characterized as either SMZ 1 or SMZ 2 to reflect the priority for planning.

District staff note that the SMZs described by the CCLRMP overlap considerably with the known scenic areas in the TSA. Two notable exceptions are the Tribune Channel and Upper Knight Inlet areas where visual management is not currently required under the Forest Practices Code. In the base case, visual management for the portions of these SMZs not within known scenic areas was not specifically modelled. The visual management regime for these areas will not be known until the process to develop VQOs for the area is completed.

However, a sensitivity analysis, which tested the potential timber supply impact of one possible management regime for visuals over the entire SMZ, was completed as part of the analysis. In this sensitivity analysis, the rVQCs currently described by the visual landscape inventory for the areas were applied. The results indicated that this regime would result in a 2.3 percent reduction in short-term timber supply.

I have considered the information about the visually sensitive areas in the Kingcome TSA, and I am satisfied that the base case assumptions appropriately reflect the known information on current management and the provisions of the VILUP higher level plan. With regard to the CCLRMP, I am aware that the implications to forest development of the recommendations for managing visual quality within the SMZs are not yet known, and as a result the timber supply implications are not yet possible to determine. It is likely that the recommendations may lead to more restrictive management considerations for visual quality over time for these areas. However, in accordance with my Guiding Principles, I cannot account for management within the SMZs until the management regime is developed and approved for these areas. For this determination, I am satisfied that current practice has been appropriately reflected, and I make no further adjustments on this account.

- riparian habitat

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting, in order to protect riparian and aquatic habitats. Stream classes (e.g. S1) described in the *Riparian Management Area Guidebook* are determined based on presence of fish, occurrence in a community watershed and average channel width criteria. The stream class is used to estimate RRZs and RMZs requirements.

Information from the 1996 Wildstone Resources report was considered in the development of appropriate reductions to apply in the analysis to account for management in riparian reserve and riparian management zones. The values from the Wildstone Report suggested that 4.8 percent of the timber harvesting land base may be constrained by RRZs, and a further 4.2 percent by RMZs, for a total of 9 percent of the timber harvesting land base.

In 1999, district staff conducted an investigation using local data to attempt to verify the applicability of the Wildstone estimates to the Kingcome TSA. The results of this study indicated that the estimated area constrained by RRZs was more likely to be 4.7 percent.

In the base case, it was assumed that 4.7 percent of the timber harvesting land base should be excluded for RRZs, and an additional 4.2 percent for RMZs. The total retention to account for management practices in riparian habitat was assumed to be 8.9 percent. These values were reported in the data package.

International Forest Products expressed concern about the values proposed in the data package, and initiated its own study in 2001 to assess the retention practiced operationally. District staff also conducted a further review in 2001, using data from 50 SPs, to ascertain whether more precision could be achieved around the values.

District staff indicate that their 2001 review did not include sufficient representation of all stream classes (particularly S1 to S3 streams) to be able to provide a useful estimate of RRZ retention. The results suggested that 6.8 percent of the area may be retained operationally for RMZs, although the estimate includes an unknown amount of overlap with areas excluded in the analysis for other reasons, such as terrain stability and WTPs.

I note that the concern around the inability to estimate RRZs from the 2001 district study (due to inadequate representation of all stream classes) also applies to the estimates for RMZs derived from that study. The results of the 2001 district study showed a total impact on the timber harvesting land base of 9.7 percent, an impact which is not inconsistent with the total value indicated by the Wildstone report of 9 percent. Although the retention values are distributed differently between RRZs and RMZs for the different studies, the magnitude of impact was found to be very similar. In fact, using a completely different methodology, the studies indicated values within one percent of one another, which I consider to likely be within the bounds of uncertainty normally found in estimating such values.

In consideration of the information provided and following extensive discussions with district staff, I believe that the analysis assumptions to account for management practices in riparian areas were likely a reasonable reflection of operations. I will, however, remain mindful of the risk that the impacts to the timber harvesting land base of management in

RMZs may have been slightly underestimated, but to a degree that cannot be precisely quantified, and I will discuss this further under 'Reasons for decision'. I request that district staff review practices over the term of this determination, so that the next timber supply review for the Kingcome TSA can incorporate estimates based on the best information available at that time.

As a final note, I am aware that the Natural Resource Defence Council submitted input that exclusions for riparian zones inadequately reflected federal fisheries and oceans retention requirements. The input pointed to a letter submitted by the Department of Fisheries and Oceans (DFO) in February 2000 to the BC Ministry of Forests, in which concern was expressed that riparian protection given to small fish bearing streams and their tributaries may be inadequate. The input from the NRDC on the Kingcome timber supply review further states that the DFO asserted constitutional authority over the Forest Service under the *Fisheries Act*. However, I note that following the February 2000 DFO submission , personnel from the DFO, the Ministry of Water, Land and Air Protection, the Council of Forest Industries and the BCFS jointly completed an investigation of riparian practices. The resulting published report did not validate the initial concerns, although some areas requiring improvement were documented. Also, further work subsequently resulted in the DFO and the BCFS jointly rewriting the *Fish Stream Crossing Guidebook* to give better guidance to field staff. Accordingly, I am satisfied that the issues raised by the DFO have been resolved.

- recreation

The Port McNeill forest district manages two road-accessible recreation sites, seven marine sites, and 10.5 kilometres of recreation trails within the Kingcome TSA. Recreation sites were fully excluded from the timber harvesting land base. Recreation trails were not excluded, given that current management allows for harvesting in the general area surrounding trails, with increased levels of retention to minimize the impacts. District staff indicate that the assumptions in the analysis regarding recreation sites and trails are reflective of current practices.

ESA data was used to identify and exclude areas of high recreation value, such as recreation sites, in the derivation of the timber harvesting land base. A total of 245 hectares of operable area was excluded to account for recreation management.

A new digital recreation features inventory has been completed for the TSA but the data were not available in time to be used for the timber supply analysis. District staff indicate that the inventory is considered by licensees when preparing operational plans, but to date there has been no significant impact to operations. Overall, staff believe that the magnitude of the land base reductions applied using the Er1 data is appropriate to reflect the impact of recreation management in the TSA.

I have considered the information about recreation in the Kingcome TSA, and I am aware that the recreation features inventory offers more comprehensive information than that used in the timber supply analysis. However, I accept that there are no implications to timber supply for this determination, and I make no adjustments in this regard.

I request that BCFS staff ensure that the most current available information is used in the next timber supply analysis.

- wildlife habitat

The forests of the Kingcome TSA provide habitat for a broad diversity of wildlife species, including grizzly and black bear, mountain goat, black-tailed deer, cougar, wolf, marbled murrelet, northern goshawk, bald eagle, Keen's long-eared myotis and tailed frog.

Following are my considerations of some of the provisions made in the analysis for wildlife species.

1) identified wildlife

'Identified wildlife' refers to species at risk (red- and blue-listed) and to regionally significant species which are potentially affected by forest management activities and which may not have been adequately accounted for with existing management strategies, such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints. Species at risk as defined under the Forest Practices Code also include those species that are not considered at risk provincially but which have regional populations that may be threatened. By addressing the habitat needs of 'regionally important wildlife' early on, the possibility that they will become listed provincially as threatened or endangered at a later date may be avoided.

Volume I of the IWMS was released in February 1999 and details several species which may occur in the TSA and that may require future consideration, including the tailed frog, northern goshawk, sandhill crane, marbled murrelet, Cassin's auklet, Keen's long-eared myotis, fisher, grizzly bear and mountain goat. Volume II, which has yet to be released, may identify additional species. The species identified in Volume I will be managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans.

In the Kingcome TSA, no WHAs have yet been established, and GWMs have not yet been implemented. No specific accounting for the management of identified wildlife species was made in the timber supply analysis.

The Province has committed to implementation of the IWMS and limitation of short-term timber supply impacts to one percent across the province.

Given the species known to be present in this TSA, I expect that the future establishment of WHAs will reduce the timber harvesting land base by the full one percent described by provincial policy. I will thus take into account in this determination a one percent impact on timber supply, which I believe accommodates WHAs expected to be established in the near future.

I have considered the risk posed to mid- to long-term timber supply as a result of this factor, and I will discuss this further under 'Reasons for decision'.

2) ungulate habitat

Ungulate winter range (UWR) for deer has not yet been officially mapped in the Kingcome TSA. Areas of UWR are expected to be refined and legally designated under the Operational Planning Regulation provisions prior to October, 2003.

Until UWR areas are defined in the TSA under the OPR process, ESA mapping for wildlife (Ew) represents the best available indication of potential ungulate habitat and was used in the timber supply analysis to exclude areas. The Ew mapping primarily reflects deer winter range on the Vancouver Island portions of the TSA and goat range on the mainland portion. In the timber supply analysis, a total of 5258 hectares classified as Ew1 and 524 hectares classified as Ew2 were excluded in the derivation of the timber harvesting land base.

District staff indicate that the accuracy of the areas is somewhat dated and does not likely reflect the final placement of the UWR areas. However, staff believe that the exclusions represent the approximate amount of area expected to be reserved in the long-term to provide for ungulate habitat.

Having considered the information about the exclusions in the analysis to account for ungulate habitat, I am satisfied that the assumptions are consistent with current provincial policy. The information used in the analysis represents the best available information, and provides a reasonable accounting for ungulate habitat. As ungulate winter ranges are refined and designated prior to October 2003, any revised information can be incorporated into the next timber supply analysis for the Kingcome TSA.

- cultural heritage resources

Many portions of the Kingcome TSA possess significant archaeological and cultural heritage values, particularly culturally modified trees (CMTs), shell middens and burial sites. Archaeological overview assessments were completed in 1995 and 1999, and traditional use studies (the Galgalis and Quatsino) have also been conducted. Information from these studies as well as consultation with First Nations during operational planning assist with the identification of areas of potential sensitivity. Archaeological impact assessments (AIAs) are conducted by licensees for specific areas as directed by the district manager.

District staff indicate that in operational practices to date, cultural resource values have not usually been located within the timber harvesting land base. Those encountered typically have been incorporated into a wildlife tree patch or accommodated by slight adjustments to cutblock boundaries. Staff also note that the recommendations of the AIA may be such that there are no impacts on operations. Overall, staff state that operations thus far have largely not been affected as a result of management for cultural heritage resources. However, staff note that licensees have in the past largely been operating in areas with lower levels of historic use by First Nations. More recently, operations have been progressing into areas with higher historic levels of use, and consequently more resources, such as CMTs are being encountered. It is becoming more difficult to incorporate the greater number of resources into WTPs, and staff believe that a level of operational adjustment may be now occurring. However, staff cannot yet provide quantification of the expected operational impacts or any resulting timber supply implications.

In the timber supply analysis, no land base exclusions were applied to specifically account for management for cultural heritage resources, as it was expected the exclusions for wildlife tree patches and riparian areas would also address the implications of management for cultural heritage resources.

Public input from the Sierra Club expressed surprise that there were no specific exclusions in the analysis given the archaeological values in the TSA. In the same input, the Sierra Club made a number of comments related to their understanding of the interests of First Nations, including commenting that there was a lack of socio-economic benefits, and that forest harvesting impacts adversely on traditional use activities, cultural sites and fisheries.

I have considered the information about cultural heritage resources in the Kingcome TSA. The accounting in the analysis for stand level biodiversity and other values has addressed the implications of past management for cultural heritage values in the TSA. However, I am mindful that impacts to timber supply incremental to those assumed in the analysis will likely occur in the future as a result of managing for these resources. As licensee operations encounter the resources, there is a high likelihood that some areas will be more constrained than was accounted for in the analysis. As a result, I will take into account in this determination the likelihood that the timber harvesting land base has been overestimated by some small amount, and I will discuss this further under 'Reasons for decision'.

I note that from discussions with district staff that I believe that the management of these areas is being conducted appropriately at the operational planning level given the obligations under the Forest Practices Code to manage for the resources. I request that district staff continue to monitor the operational implications over time, so that ongoing operational experience can make it possible to better quantify the impacts.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests. The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy.

The *Landscape Unit Planning Guide* outlines three biodiversity emphasis options (BEOs)—lower, intermediate and higher—which guide the establishment of biodiversity management objectives for a landscape unit. The guide outlines the proportions of each subregional planning area that should be assigned to each of the three BEOs. The proportions in lower and intermediate biodiversity emphasis can range from 30 to 55 percent, but the average is approximately 45 percent of the area in lower, 45 percent in intermediate, and 10 percent in the higher BEO landscape units. The policy generally followed for timber supply analyses when landscape units and BEOs have not been formally established is to model the distribution of BEOs using a weighted average forest cover requirement.

Landscape unit planning has been initiated for the Kingcome TSA, and draft landscape unit boundaries have been delineated. No legal objectives or old growth management areas (OGMAs) have yet been established. For the portions of the TSA on Vancouver Island, draft LUs fall within the area covered by the VILUP, and are linked to the Resource Management Zones (RMZs) and associated objectives. BEOs for these LUs have been confirmed by the Vancouver Island Summary Land Use Plan. For the portions of the TSA on the mainland, the LU boundaries and draft BEOs are subject to change as a result of the final outcome of the CCLRMP process.

Because landscape units have not yet been established in the Kingcome TSA, a weighted average forest cover requirement approach, as suggested by provincial policy, was followed in the timber supply analysis. The forest cover requirements were applied at the biogeoclimatic variant level within each landscape unit as a minimum percentage of the productive forest land base which must be retained in stands meeting the requirements for mature and old forest. The *Landscape Unit Planning Guide* permits old forest requirements for areas with low BEOs to be met within three rotations, and describes no mature forest retention requirements for these areas.

In high and intermediate BEO areas, current provincial policy direction from the *Landscape Unit Planning Guide* requires old seral requirements to be met immediately. If it is not possible to immediately achieve targets in these areas, then OGMAs are designated in mature forested areas to recruit old growth forest.

In the analysis for the Kingcome TSA, the forest cover constraints for old-seral forest, including the phase-in of the requirements for lower BEOs, were applied in accordance with the *Landscape Unit Planning Guide*. Forest cover requirements for old seral forest were applied at the biogeoclimatic variant level within each landscape unit as a minimum percentage of the productive forest to be retained in stands at least 250 years of age.

In addition, in the analysis, a mature seral forest cover requirement was applied to the VILUP SMZ areas, to reflect higher level plan direction. In the Goletas Channel, West Coast Nahwitti Lowlands, and Brooks Bay SMZs, at least 25 percent of the stands in the forested area were required to be 140 years of age or greater. In the Johnstone Strait LU, the applied requirement was that at least 30 percent of the stands be 140 years of age or greater.

The VILUP higher level plan also requires that old seral objectives for the SMZ portions of the Klaskish and Shushartie LUs are to be maintained to the site series level of representation. The site series information has been collected for these areas but landscape unit planning has not yet been completed. In the base case, the old growth requirements for these areas were modelled to the variant level only. Staff believe that the impact of managing to the site series level for the areas overall is not expected to be significant given the small area of timber harvesting land base and the considerable extent of non-contributing area in these LUs. However, specific areas may be more constrained by the need to meet the requirements.

A rate of disturbance was applied in the analysis to reflect that stands are subject to natural disturbance over time. The stands on the non-contributing land base (i.e., wholly excluded from contributing to timber supply) were assumed to be subject to a rate of disturbance that approximated the natural disturbance regime for the area. For the Kingcome TSA, using

information about the existing forests and natural disturbance types, it was assumed that at all times, 20 percent of the stands on the non-contributing land base would be less than 240 years of age. To reflect this, 500 hectares of non-contributing forest area were assumed to be disturbed per year in the analysis.

Three sensitivity analyses were conducted to assess the timber supply implications of modifying the landscape level biodiversity requirements. In the first sensitivity analysis, the full old seral requirements were applied immediately in the low BEO areas using the draft BEOs available for each landscape unit. In the second analysis, mature and full old seral requirements were applied immediately using the draft BEOs. In each case in these sensitivity analyses, timber supply was found to not be affected at any point in the time horizon. In the third sensitivity analysis, in which the early, mature and full old seral requirements were applied immediately based on the draft BEOs for each landscape unit, there was a temporary timber supply shortfall in the fourth decade. Staff indicate that this shortfall would be addressed by a small decline in the mid-term harvest level.

I have considered the information about landscape level biodiversity, and the modelling assumptions applied in the analysis to reflect the implementation of landscape unit planning, and I have discussed the information with district staff. Although I am aware that the requirement for site series representation was not explicitly modelled for the SMZs under the VILUP higher level plan, I believe that there are unlikely to be significant timber supply implications. I am satisfied that the analysis has reasonably well approximated the provisions of the VILUP higher level plan. The sensitivity analysis in which constraints were applied using the draft BEOs provides me with an assessment of the implications to timber supply of implementing the regional LU planning strategy, and I note that the results indicate timber supply is unimpacted relative to current management and our current modelling approach. Once landscape unit planning is complete for the Kingcome TSA, and the remaining data collected to fully implement management requirements for landscape level biodiversity, the information can be incorporated into a future timber supply analysis.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Land Use Planning

- Vancouver Island Land Use Plan

The Vancouver Island Land Use Plan (VILUP) was announced by government in June 1994. The plan encompassed all of Vancouver Island, except Clayoquot Sound, and some adjacent islands, for a total area of 3 349 011 hectares. The plan categorized 13 percent of the area as proposed protected areas, 24 percent as enhanced management zones, 31 percent as general management zones, and 7 percent as special management zones. The remainder of the area was comprised of agriculture, settlement and private land areas.

Since 1994, a number of implementation actions have been taken, including further clarifications of the plan's intent. The Vancouver Island Summary Land Use Plan, accepted by government in 2000, further clarified direction for resource management zones and other features of the plan. The VILUP higher level plan order specifying binding land-

use objectives was promulgated by government in December 2000. The key objectives of the higher level plan that affect timber supply relate to requirements for green-up, cutblock size, visual resources and landscape unit planning.

The portions of the Kingcome TSA that are located on Vancouver Island are covered by the VILUP. As discussed under *protected areas*, all protected areas recommended by the VILUP and subsequently designated through order-in-council were excluded in the derivation of the timber harvesting land base in the analysis. Operationally, aspects of the higher level plan are being implemented by licensees, and the strategic components are expected to be implemented through landscape unit planning. The provisions of the plan are discussed under the relevant portions of this document.

Having considered the information about the analysis and the aspects of the VILUP that pertain to operations in the Kingcome TSA, I am satisfied that the assumptions in the analysis were consistent with current practices and the provisions of the higher level plan.

- Central Coast Land and Resource Management Plan

The Central Coast Land and Resource Management Plan (CCLRMP), encompasses approximately 80 percent of the Kingcome TSA. The planning process was initiated in 1997 and in April 2001, the government announced its acceptance of the recommendations of phase one of the CCLRMP - outlined in a document known as the Framework Agreement. The Framework Agreement included recommendations for the establishment of several interim land use zones, including proposed protection areas, option areas and special management zones for visual quality. The Plan recommends protection of approximately 21 percent of the planning area. Recommendations for an ecosystem-based approach to management are to be developed by an independent information team. In addition, the parties to the Plan have agreed to a 12- to 24-month moratorium on harvesting within so-called "option areas", which constitute 11.3 percent of the plan area. During that period it is expected that the information team will develop appropriate management recommendations for the areas.

As mentioned under *visually sensitive areas*, the CCLRMP also describes two Special Management Zones (SMZs) for visual quality. Phase 2 of the CCLRMP is expected to involve development of further land base zoning and management objectives and strategies, recommendations for visual quality objectives in the SMZ visual quality zones, and clarity around the implementation of an ecosystem-based management regime.

Several of the new proposed protection areas are located within the Kingcome TSA. These areas—the Ahnuhati Complex, Cape Caution, Catto Creek, Upper Klinaklini and extensions to the Broughton Marine Park—encompass 4552 hectares (2.6 percent) of the timber harvesting land base. In addition, 940 hectares or 0.6 percent of the timber harvesting land base fall within identified option areas under the agreement.

In May, 2002, the government designated 17 option areas and 20 protection areas as the Central Coast Designated Area under section 169, part 13 of the *Forest Act*. The Central Coast Designated Area is scheduled to remain designated until June, 2003. In addition, the government named the protection areas under the *Environment and Land Use Act*, a designation that is also scheduled to expire in June 2003. It is expected that by June 2003,

finalization of these areas and the planned management regime will be possible and a more permanent status for the areas can be attained.

As part of the 2001 timber supply analysis, a sensitivity analysis was conducted to examine the timber supply impacts of excluding the protection areas proposed under the CCLRMP from the timber harvesting land base. The results indicated that excluding these areas from contributing to timber supply would result in a 3 percent reduction in short-term timber supply, and a 2 percent reduction in long-term timber supply. The sensitivity analysis did not examine the impact of excluding harvesting within the one option area in the Kingcome TSA. This area is not part of the Central Coast Designated Area established under part 13 of the *Forest Act*.

In July 2002, I temporarily reduced the AAC of the Kingcome TSA by 44 000 cubic metres to account for the portion of the TSA that falls within the Central Coast Designated Area.

In consideration of the information about the Central Coast Designated Area and this determination, I note that until such time as the area becomes permanently protected, I cannot account for its exclusion from contributing to timber supply in a determination under section 8 of the *Forest Act*. Operationally, I am aware that harvest operations have been temporarily suspended in the areas, pending the final outcome of the CCLRMP processes, and consequently there are no risks to the resources at this time.

I note that my temporary AAC reduction under section 173 of the *Forest Act* remains in place following this section 8 determination, and therefore the reduction of 44 000 cubic metres also applies to my new AAC determination and will remain in place until such time as the Central Coast Designated Area ceases to be a designated area. Should the status of the area, at the time the designation is no longer in place, be changed to a permanent protection of the resources then I will consider revisiting this section 8 determination to account for the permanent exclusion of the area from contributing to timber supply.

Undercut

Due to the depressed markets and the current state of the coastal forest industry, many licensees on the TSA have not harvested their full licence AAC in recent years. Preliminary figures from the 1997 to 2001 cut control period indicate a total undercut of 715 754 cubic metres from replaceable FL holders. The Small Business Forest Enterprise Program (SBFEP) has met its annual timber sale targets for the past several years but a number of timber sales awarded in recent times have not yet been harvested.

As noted earlier, the inventory file used in the analysis was updated to August 1999 to account for changes to the forest, including depletions resulting from harvesting and fires, that have occurred since the last update was conducted. However, the inventory does not reflect any harvesting or other depletions to the forest that have occurred since these updates. The inventory was updated to February 2001 to account for any growth that had occurred in the forests.

District staff indicate that approximately 500 000 cubic metres of the total undercut volume accumulated prior to the inventory update. This volume would have been accounted for in the inventory file as standing timber, and contributed to the merchantable growing stock assumed in the analysis. District staff are concerned about the implications if this volume is sold as undercut, because the volume is in fact supporting the base case harvest forecast.

Staff note that the undercut volume accumulated since the inventory update in August 1999 is not considered to be an issue in this same manner. Actual harvesting that occurs prior to an inventory update directly influences the inventory as mature stands are converted to NSR and then regenerating stands. However, once the timber supply modelling horizon begins, the 'harvest level' since the last inventory update is the timber supply model harvest projection, and the actual harvest level becomes irrelevant in the simulation. In the analysis for the Kingcome TSA, the inventory was assumed to be depleted at a rate equivalent to the base case initial harvest level of 1 319 000 cubic metres per year.

District staff express concern that subsequent to the last timber supply review process, three non-replaceable forest licences were issued, and additional timber sale licences awarded in the TSA, to dispose of the undercut volume existing at that time. District staff indicate that these actions resulted in further pressures on an already limited land base and declining timber supply.

I have reviewed the information about the undercut volume in the Kingcome TSA, and I am aware of the concerns expressed by the district. While these concerns are not something I can explicitly take into account in my AAC determination, I am able to make two observations which may clarify the situation for the record.

Firstly, I note that the timber supply analysis is premised on the best assessment of available growing stock at the time of the analysis. When a new AAC determination is to take place, information is gathered to represent the best assessment of the available timber volume at that time. Any undercut volume that is purported to be available in the TSA at that time, is in reality supporting the harvest forecast upon which the new AAC determination is based. Therefore there is no 'surplus' growing stock in the TSA. My AAC determination fully accounts for all of the available growing stock in the TSA, including that accumulated through undercutting up to the start of the analysis harvest projection.

Secondly, I note that given this information, and the projected decline in mid-term timber supply to the long-term level in the Kingcome TSA, one consequence of selling carry-forward volume will be to accelerate the rate of decline in timber supply in the Kingcome TSA.

Harvest Sequence of Second Growth

In the base case, the relative oldest first harvest rule was used to sequence stands for harvesting. This harvest rule places highest priority for harvesting in the model to those stands that are the oldest, relative to their minimum harvestable age.

Over the past few years, the district manager has received requests from some licensees to harvest high volume and accessible second-growth hemlock/balsam stands. The district manager has rejected these requests, primarily due to concern about potential impacts to the mid-term timber supply for the TSA if second growth stands are harvested prematurely, in particular given the imbalanced age class distribution currently existing in the TSA.

A sensitivity analysis was conducted to investigate the impact of increasing the proportion of second growth harvested in the initial periods of the forecast. District staff developed specific criteria to define the extent and location of second growth stands potentially suitable for harvesting, defined as follows: hemlock-leading stands between 70 and

140 years of age on good and medium sites in six of the TSA's landscape units. In the sensitivity analysis, a minimum harvest target of 200 000 cubic metres per year (equating to 15 percent of the initial harvest level) was to be met from these stands.

Results of the sensitivity analysis indicate that this minimum harvest target could be achieved if the initial harvest level was reduced by 4 percent. The harvest level remained below that of the base case for the first six decades of the analysis horizon. At that point, it returned to the base case level, but did not increase above it.

As mentioned under *adjacency and green-up*, input received from International Forest Products Ltd. stated the opinion that a significant disconnect exists between the volume shown to be available in the analysis, and the operational ability to achieve the AAC. The licensee attributes the disconnect not to lack of timber but to other factors such as access to second growth, visually effective green-up and adjacency constraints. The licensee suggested that analysis from other coastal management units indicate prioritizing the harvest of second growth stands can minimize fluctuations in the availability of old growth stands over time and help to overcome short-term timber availability issues.

However, as shown by the sensitivity analysis results discussed above, I am not convinced that harvest of second growth would produce the outcomes suggested by the licensee in the Kingcome TSA. Staff also note that harvesting high value second growth stands at this time will have an added negative effect of isolating higher cost marginal old growth stands in the TSA.

I have considered the information about the timber supply implications of focusing harvest on second growth stands in the TSA. Notwithstanding the licensee's concern about the spatial relevance of the analysis, I am aware that the sensitivity analysis results do substantiate the concern that harvesting in second growth stands would reduce the short-term harvest level and total available timber supply.

I accept that for this determination that current practice has been reasonably well reflected through the choice of harvest rules. If current practice shifts over time such that an alternative rule is more appropriate, then this can be reflected in a future analysis.

With respect to the licensee's comments regarding the aspatial nature of the analysis, I note that this issue has been examined in the past and results indicate that the methodology and approach used in BCFS timber supply analysis is a reasonable reflection of operational reality. Representation through a spatial model can serve to further or lessen the constraint relative to operations, depending on the assumptions made and the nature of the model. I am satisfied that the assumptions in the base case were appropriate, and I note that harvest in second-growth stands at this time in the Kingcome TSA reduces short- and mid-term timber supply, with no incremental increase relative to the base case in long-term timber supply.

<u>First Nations considerations</u>

With respect to First Nations issues in the Kingcome TSA, I am aware of the following:

- Eleven First Nations bands have asserted traditional territories within the Kingcome TSA. These First Nations are the Quatsino First Nation, Gwa'Sala-'Nakwaxda'xw First Nation, Kwakiutl First Nation, Da'naxda'xw First Nation, Tlatlasikwala First

Nation, Mamalillikulla-Qwe'Qwa'Sot'Enox First Nation, Tsawataineuk First Nation, Gwawaenuk Tribe, Kwicksutaineuk-ah-kwaw-ah-mish First Nation, Namgis First Nation and the Tlowitsis Tribe.

- Each of these eleven First Nations were forwarded copies of the Kingcome Timber Supply Area Data Package, Information Report, Timber Supply Analysis and Public Discussion Paper, and were asked to review the documents and provide written comments. The First Nations were also invited to contact the Port McNeill forest district if they desired a presentation on the information. There were no responses or requests for meetings or presentations. Representatives from two of the bands did attend a Timber Supply Analysis Report presentation held at the district office, but no specific comments were made or subsequently submitted to forest district staff. Therefore, I have not directly been presented with information specifically from First Nations respecting this AAC determination.

- The Hamatla Treaty Society and Winilagalis Treaty Group, which includes membership from several TSA First Nations, have reached stage 4 of the British Columbia Treaty Commission process.

As is the case with the Arrowsmith TSA, Douglas Treaties cover portions of the Kingcome TSA. These treaties were originally signed many years ago, and provide rights to hunt and fish. In general, I believe that hunting, fishing and other traditional uses within the TSA can be accommodated within the provisions of the Forest Practices Code, including management of riparian and biodiversity objectives. As mentioned earlier in this document, these objectives were reflected in the timber supply analysis.

I am aware that some of the First Nations mentioned in the first paragraph of this section have asserted title to areas within the Kingcome TSA. For those groups involved in the treaty process, these claims are summarized in the treaty process Statements of Intent. Other groups have asserted title as part of discussions and consultations respecting operational plans. Many of the claims overlap geographically. With respect to assertions by the Gwawaienuk First Nation, and the Hamatla and Winalagalis Treaty organizations, of aboriginal interests within the Kingcome TSA, I note that these claims introduce uncertainty to my determination. However, I observe that the nature, scope, and geographical location of potential rights and title remain inconclusive. As such I am not convinced at this time that the interests would logically extend to an impact on the AAC. Based on these conclusions, I will make no related adjustments for this determination.

I will consider any new information, including any decisions on treaty negotiations with the First Nations that are undertaken by government, at the time of my next AAC determination. If new information contradicting any of my conclusions becomes available during the effective term of this determination, I may re-visit this determination prior to the required time.

In the meantime, as I have noted in my 'Guiding Principles,' the AAC that I determine should not in any way be construed as limiting the Crown's obligations resulting from recent court decisions including those of the Supreme Court of Canada. In this respect, the AAC that I determine does not prescribe any particular plan of harvesting activity within

the Kingcome TSA by requiring any particular area to be harvested or to remain unharvested. My AAC determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

As I make my AAC determination, I am mindful of the responsibility of other statutory decision makers to administer the determined AAC consistently with other legislation, and with relevant court decisions respecting the interests of First Nations.

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing the sustainability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

Several harvest forecasts would have been possible for the Kingcome TSA, given the current management regime and assumptions made in the analysis. The assumptions for these options are discussed in detail in the *November 2001 Kingcome Timber Supply Area Analysis Report*.

The base case harvest forecast represents one strategy for managing the decline in the Kingcome TSA from the then current AAC to the long-term harvest level. It was defined using the following harvest principles:

- a stable long-term harvest level, and stable growing stock in the long term;
- ensuring that the harvest level never dipped below the long-term sustainable level using natural stand yields;
- a rate of decline no greater than 10 percent per decade; and,
- setting the initial harvest level at the maximum level possible (i.e., up to the level of the then current AAC) without violating any of the above principles.

Two alternative harvest flows were generated, in which different harvest targets in the short and mid-term periods were applied. In both alternatives, the long-term level was the same as that of the base case.

In the first alternative, a mid-term harvest level that was half way between the mid- and long-term levels in the base case was chosen. In this alternative, an initial harvest level of 1 227 000 cubic metres per year, or 7 percent below the initial level in the base case, was

maintained for one decade before beginning a series of 10 percent declines to a mid-term level 14 percent above that of the base case.

In the second alternative harvest forecast, a non-declining harvest level was set, in which an initial harvest level of 910 000 cubic metres per year was maintained for 10 decades before increasing to a long-term harvest level of 973 000 cubic metres per year.

As mentioned earlier in this document under Base case for the Kingcome TSA, I have reviewed the alternative harvest forecasts provided, and I am satisfied that the harvest flow presented in the base case provides the best forecast of the available timber supply, and provides a suitable basis from which to evaluate the assumptions applied in the analysis.

Community implications

A socio-economic analysis was conducted as part of the timber supply analysis, in which the impact of timber supply adjustments on local communities and the provincial economy was assessed. The assumptions and findings of the socio-economic analysis are presented within the *November 2001 Kingcome TSA Timber Supply Analysis Report*. I have reviewed the information in the socio-economic analysis and am mindful of the implications to communities of variations in the harvest level of the Kingcome TSA.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

I have reviewed the information regarding timber processing facilities, and I am aware of the reliance of timber processing facilities on the volume harvested in the Kingcome TSA.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

In its input, the Sierra Club of BC stated that the long run sustainability referred to in the Minister's letter did not equate to the sustained yield of timber, and therefore a long-term perspective that is not limited to the benefits of timber production should be taken. However, I note that the timber supply analysis does not merely focus on timber production, but rather incorporates assumptions about management for resource values other than timber, and attempts to project the availability of timber given the achievement of these management objectives. In the same input, the Sierra Club directs me not to consider local objectives that do not fit in with long run sustainability. I note that in any event, I consider local objectives but am not bound by them, nor do they fetter my role as a statutory decision maker in the determination of an AAC.

I take the Vancouver Island Land Use Plan (VILUP) higher level plan order as an important expression of local objectives for the Kingcome TSA. Similarly, I consider the recommendations of the CCLRMP planning process as endorsed by government to be an expression of local objectives for the portions of the TSA covered by the plan.

The Minister's memorandum addressed the effects of visual resource management on timber supply. In it, the Minister asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. As discussed under *visually sensitive areas*, in response to the 1998 provincial strategy for visual quality management, the Port McNeill Forest District has taken measures in accordance with this strategy. I am satisfied that the assumptions regarding visual resource management in the TSA, and reflected in the analysis, are consistent with the direction in the Minister's letter and the VILUP.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Kingcome TSA. I am satisfied that this determination is consistent with the Minister's direction as expressed in these documents.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. The BC Forest Service provided a number of opportunities for public input through the timber supply review process for the Kingcome TSA, including opportunities to review the data package and the timber supply analysis and to respond to the public discussion paper. Numerous open houses and meetings were held to obtain feedback. Submissions were received from regional district representatives, licensees, interest groups, and individuals. A summary of this public input is reproduced in full as Appendix 5.

While space limitations do not allow me to address much of the input in this document, I have responded to some input under the appropriate factors. As with all AAC determinations, regardless of whether the input is specifically discussed in this document, I have considered all of the public input received in my determination of an AAC. Some of the opinions expressed in the input relate to items outside my mandate to take into account as chief forester under my legislated authority for an AAC determination. For example, suggestions about allocation of timber harvesting rights are within the mandate of the Minister of Forests and not the Chief Forester. Opinions were expressed from various

stakeholders recommending that the AAC be increased, maintained or decreased. While I acknowledge the opinions expressed, I note that any decision that I make on the harvest level for the TSA must be predicated on sound information, and I cannot speculate about land use or other decisions which have not been taken by government. As also mentioned elsewhere in this document, I am satisfied that the timber supply analysis provides me with a sound basis from which to assess the timber supply for the TSA.

As mentioned above, local objectives have been an important consideration in my determination of an AAC for the Kingcome TSA.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Unsalvaged losses

In the base case of the analysis, it was assumed that 13 583 cubic metres per year were lost as a result of wind and fire.

I have reviewed the analysis assumptions about unsalvaged losses in the Kingcome TSA, and I am satisfied that losses were appropriately accounted for in the reference harvest projections. As a result, I will not further discuss my considerations in this rationale. However, given the increased use of retention silvicultural systems and other reserves on the land base, I suggest that district staff monitor unsalvaged losses, particularly from wind, to ensure that actual losses are well reflected in the loss estimates.

Reasons for decision

In reaching my AAC determination for the Kingcome TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

The base case harvest forecast indicated that an initial harvest level of 1 319 000 cubic metres per year (5.7 percent lower than the pre-July AAC), could be maintained for one decade, followed by a series of declines of approximately 10 percent per decade for five decades to a mid-term harvest level of 740 455 cubic metres per year. The long-term harvest level of 973 000 cubic metres per year was reached after the tenth decade. As discussed under Base case forecast for the Kingcome TSA, I accept that this forecast provides me with a good basis from which to assess the assumptions regarding land base, management practices and timber yields for this TSA.

Section 8 of the *Forest Act* requires me to consider a number of factors in the determination of an AAC for a timber supply area. In determining an AAC, my considerations identify factors which, when considered separately, indicate that the timber supply may actually be greater or less than that projected in the base case. Some factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of the determination.

I am satisfied that the assumptions applied in the base case harvest forecast for the majority of the factors applicable to the Kingcome TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to take into account implications to the timber supply projected in the base case.

Factors which indicate that the timber supply projected in the base case forecast may be overestimated, and to a degree that can be quantified to some extent, are as follows:

1) Woodlots – in order to fully account for the removal of the area associated with all woodlots from the TSA, I accept that a reduction in the size of the timber harvesting land base of 120 hectares is appropriate. This represents a very small (0.07 percent) reduction in timber supply across all time horizons;

2) Volume estimates for existing stands - as a result of some residual uncertainty in the volume estimates for existing stands on the 25 percent of the timber harvesting land base that is covered by the older forest cover inventory data, I accept that short- to mid-term timber supply may have been overestimated by up to 2 percent in the base case;

3) Silvicultural systems – I accept that the increasing use of retention silvicultural systems in the TSA indicates that timber supply has been overestimated in the base case by up to 0.75 percent, across all time horizons;

4) Identified wildlife - I accept that the implementation of the measures of the identified wildlife management strategy, including establishment of wildlife habitat areas, will likely result in a one percent reduction in the size of the timber harvesting land base, which will have a corresponding effect on timber supply across all time horizons;

In addition to those factors for which some quantification is possible, there are also two factors indicating that timber supply has been overestimated, but to a degree that cannot be readily quantified;

1) Cultural heritage resources – I accept that there is a risk to timber supply in the mid to long term as a result of the likelihood of further identification of culturally modified trees and other cultural heritage resources on the timber harvesting land base;

2) Riparian management zones – I accept that there is an unquantified risk to timber supply as a result of the potential underestimate of volume retention in riparian management zones.

I am aware that there are also some factors that indicate that timber supply as projected in the base case of the analysis has been underestimated. These factors can be divided into those that are readily quantifiable, and those that are not. The factors for which some degree of quantification is possible are as follows:

1) *Sites with low timber growing potential* – I accept that 700 additional hectares should be considered as timber harvesting land base as a result of an over-accounting for sites with low timber growing potential, which translates to a 0.4 percent impact on timber supply across all time horizons;

2) *Green up* – I believe that accounting for uncertainty in the appropriate level of constraint to apply to reflect operational considerations in the TSA, indicates that timber supply in the short term may have been underestimated by somewhere between 0 and 1 percent;

3) *Regeneration delay* – As a result of slight overestimations of regeneration delay for some stands, I accept that timber supply has been underestimated by 0.5 percent in both the short and long terms;

4) *Site productivity* – I am satisfied that the productivity of second growth forests will be greater than indicated by data from existing old growth forests. The exact magnitude of

this underestimation is uncertain, although sensitivity analysis indicated it could be as high as 21 percent in the mid to long term;

5) *Class A seed* – I accept that long-term timber supply has been underestimated by as much as 3.3 percent as a result of not accounting for the current use of class A seed in the base case.

In consideration of the cumulative effects of the factors acting to either increase or decrease timber supply in the short term, I have the following observations. The factors acting to increase short-term timber supply - adjustments to green-up constraints, site with low productivity, and regeneration delay – are small, and additively result in a 0.9 to a 1.9 percent increase in timber supply. Those quantified factors acting to decrease short-term timber supply – woodlots, existing stand volume estimates, variable retention and identified wildlife - indicate a 3.8 percent decrease in timber supply, relative to the base case projections. I thus note that, with an accounting for the range of uncertainty for some of the factors, the combination of quantifiable factors indicate that timber supply has been overestimated in the base case forecast by between about 2 and 3 percent. Considering the level of uncertainty afforded by those factors acting to decrease timber supply that could not be well quantified – cultural heritage resources, and riparian management practices – I apply some additional caution to this range of values, and therefore, I conclude that timber supply in the short term has been overestimated by 3 percent.

The factors acting in the longer term to increase timber supply suggest that the mid- to long-term harvest levels could be underestimated by the base case by between 4 and 25 percent, depending on whether weight is placed on the site productivity underestimates on sites currently occupied by old growth forests. I am convinced that second growth forests will have higher productivity than currently projected by these sites. There are factors acting to mitigate these upward influences, such as the effects of the implementation of variable retention and the identified wildlife management strategy, the land base withdrawal associated with woodlots, and the uncertainties around cultural heritage resources and riparian management. However, in consideration of all of the factors influencing longer term timber supply I expect that in the mid to long term, timber supply in the Kingcome TSA will be greater than shown in the base case harvest projections.

I am well aware that the base case projection in the 2001 analysis indicates that timber supply is much more stable than was believed at the time of the previous analysis. Some of the factors influencing this were discussed earlier in this document under Base case forecast for the Kingcome TSA, and include that there is less land base constrained by visuals, lower green-up ages and higher average site productivity within the timber harvesting land base in the most recent analysis. The VRI data used in the analysis is expected to provide a more accurate representation of stand characteristics than older forest cover data. I am satisfied, from review of the information presented to me, that the best available information has been applied in the 2001 analysis, and I expect that timber supply in this TSA may very well now be more stable in the mid to long term than has been exhibited over the past several years of adjustments.

Applying a reduction of 3 percent to the initial harvest level presented in the base case indicates a harvest level of 1 279 000 cubic metres per year. I am mindful that an additional 5000 cubic metres of volume is initially available from cottonwood-leading

stands in the TSA, beyond the harvest level projected in the base case, and I take this into account in this determination. This brings the harvest level to 1 284 000 cubic metres per year. I will explicitly partition 20 340 cubic metres per year of this volume to deciduous-leading stands, within which is the expectation that 5000 cubic metres per year will be harvested in cottonwood-leading stands, and 15 340 cubic metres per year will be harvested in red alder-leading stands. I also hold the expectation in this determination that a further 95 000 cubic metres per year will be harvested from low productivity stands, although at this time I will not partition to these areas. However, I make note that the AAC is predicated on performance and utilization in the lower end of the profile, to a level of about 95 000 cubic metres per year, as shown in the base case of the analysis. Therefore, in consideration of all of this information, I determine that an appropriate harvest level for the Kingcome TSA at this time is 1 284 000 cubic metres per year.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Kingcome TSA by establishing an AAC of 1 284 000 cubic metres.

This harvest level includes a partition of 20 340 cubic metres per year to deciduous-leading stands.

This AAC excludes all volume issued to woodlot licences since the 1996 determination.

I note that my July 2002 temporary AAC reduction under section 173 of the *Forest Act* remains in place following this section 8 determination, and therefore the reduction of 44 000 cubic metres also applies to this new AAC determination. The temporary reduction remains in place until such time as the Central Coast Designated Area ceases to be a designated area. Should the status of the area be changed to a permanent protection of the resources then I will consider revisiting this section 8 determination to account for the permanent exclusion of the area from contributing to timber supply.

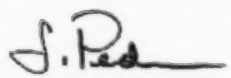
If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than five years.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Kingcome TSA.
I recommend that district staff carry out the following:

- continue to review the criteria to define low productivity stands;
- collect local data to better define the site productivity of second growth stands;

- continue to monitor the implementation of retention silviculture systems to better determine their impact on the timber harvesting land base;
- continue to monitor the operational implications of management for culturally modified trees, so as to better quantify the timber supply impacts;
- continue to assess the operational practices in riparian management zones to determine what values best reflect current practices;
- work with the appropriate agencies to establish wildlife habitat areas and implement general wildlife measures as outlined in the identified wildlife management strategy;
- monitor unsalvaged losses, particularly for wind and as a result of the increased use of retention silvicultural systems and increased area of reserves on the land base.



Larry Pedersen
Chief Forester
September 12, 2002

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8 (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area,

(c) [Repealed 1999-10-1.]

(6) **The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.**

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silviculture treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

1998-29-2; 1999-10-1; 2000-6-2; 2002-25-21.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
Ministry of Forests
OFFICE OF THE MINISTER

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis.*

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

Kingcome Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
Port McNeill Forest District
Box 7000
Port McNeill, BC V0N 2R0

September, 2002

This is a summary of the public input received on the Timber Supply Review in the Kingcome Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Kingcome Timber Supply Area

Background

As part of the review of timber supply in the Kingcome Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Kingcome TSA *Data Package* and *Information Report* in June 2000. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Kingcome TSA. A 30-day review period, ending July 24, 2000, was provided for the public to comment on these documents.

On November 29, 2001, the British Columbia Forest Service released the *2001 Kingcome Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 60-day review period that ended January 28, 2002.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Kingcome TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Port McNeill Forest District office in Port McNeill.

Public Review Process and Response

Staff from the Port McNeill Forest District actively solicited public input on the Timber Supply Review in the Kingcome TSA through the following actions:

- in June, 2000, approximately 100 copies of the *Information Report* and 50 copies of the *Data Package* were mailed, e-mailed or distributed to stakeholders in the TSA, including First Nations, licensees, local governments and environmental groups. Meetings or presentations were offered.
- in November and December, 2001, approximately 125 copies of the *Timber Supply Analysis Report* and *Public Discussion Paper* were mailed or distributed to stakeholders in the TSA. Meetings or presentations were offered.
- additional copies of all four reports were available at the district office in Port McNeill and the Vancouver regional office in Nanaimo.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- copies of all the documents were made available to the local media. An interview was conducted with the local newspaper.
- referrals were made to the Ministry of Forests website where documents were available to download.

In addition, the following information sessions were held:

- July 10, 2000. Presentation to the Mount Waddington Community Resources Board. Ten attendees.
- July 19, 2000. Presentation to District of Port Hardy Council. Fifteen attendees.
- Aug. 15 and Sept. 19, 2000. Presentations to the Mount Waddington Regional District board. Ten attendees at each session.
- Dec. 11, 2001. Presentation to International Forest Products employees in Campbell River. Seventeen attendees.
- Dec. 14, 2001. Presentation in Port McNeill to local forest licensees. Five attendees.
- Dec. 6 and 13, 2001. Open houses in Port McNeill and Port Hardy. Two attendees

The Port McNeill Forest District office

received nine written submissions on the *Data Package* and six submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Kingcome TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

Data Package

Operable Land Base
International Forest Products Ltd. (Interfor) notes that in the previous Timber Supply Review (TSR1), a 1993 operability assessment was used and the company states their desire to continue participating in the ongoing re-evaluation of operability limits. Interfor also says operability in the Klinaklini Supply Block should be reviewed given current economic conditions.

The Sierra Club of BC questions the definition of operability as "feasible to harvest from an economic or physical standpoint." The group questions how an area could be considered operable if only one of those factors applied, and suggests replacing "or" with "and."

Low Sites
Interfor says the exclusion of stands from the harvesting land base based on existing site index estimates that are known to be underestimated may remove economically operable types. The company recommends:

- assessing the impact on second growth if Old Growth Site Index (OGSI) adjustments are applied.
- not excluding any stands with logging history.
- comparing the criteria for defining low sites against recently harvested areas.

Environmentally Sensitive Areas (ESAs)
Interfor notes that a recreation features inventory is nearing completion and existing wildlife areas are under review, although neither process will be completed in time for this Timber Supply Review. However, the company says the results should be assessed as soon as they're available and if significant changes from old ESA mapping are evident, they could be incorporated as sensitivity analyses.

The Sierra Club expresses approval for reviewing ESA mapping for wildlife (Ew), saying that the restriction of Ew areas to deer and elk habitat is not adequate. They say the Ministry of Forests must anticipate the need for more Ew's to protect a wider variety of wildlife, and the timber supply analysis should also make allowances to replace Ew's that have been harvested.

With regard to ESAs for terrain stability, Interfor says the exclusion of Class IV areas could have a two to three percent negative impact on timber supply. They say a GIS exercise to correlate existing terrain assessments with specific slope classes is underway, and results will be extrapolated to other parts of the land base not covered by terrain stability overview assessments. Interfor says they want to review this analysis to evaluate operational reasonableness.

The Sierra Club says the chief forester's requirement for better terrain studies for this Timber Supply Review has not been fulfilled. The group recommends a conservative approach, saying Class V terrain should trigger a 100 percent netdown and expressing the opinion that a 20 percent netdown for Class IV is inadequate.

An individual submission notes that funding was not available for an analysis of unstable slope terrain in the TSA, and says the questionable methodology used in the analysis leaves the public exposed to remediation and compensation costs resulting from harvesting in unsuitable areas. This individual says this can be seen as a public subsidy to the forest sector.

Roads, Trails and Landings (RTLs)
Interfor says the deduction for RTLs should be decreased due to increased heli-logging and road deactivation.

Forest Inventory
Interfor says the 1995 inventory audit indicates the forest inventory overestimates standing inventory by 18 percent in the operable land base, affecting short- and medium-term timber supply. The company says that until Vegetation Resources Inventory (VRI) data is integrated into the inventory, at least an evaluation of the reliability of the results should be completed.

The Sierra Club says Table 1 of the *Data Package* indicates that the standing volume of mature timber in the northern 30 percent of the TSA is still overestimated; the status of the southern 70 percent where Phase 1 of the VRI was completed is unclear. The group urges the use of conservative estimates, saying it's better in the long term for both the ecology and the economy to have too much mature forest rather than too little.

Expected Rate of Growth
Interfor recommends maximizing the use of OGSI factors where appropriate, as this will provide increased yields, faster green-up rates and lower minimum harvestable ages (MHAs).

Interfor says tree improvement programs represent current practice so estimates of productivity gains should be used in the base case. The company says long-term gains could be in the order of three to four percent; short-term gains can result if green-up ages and MHAs are limiting timber supply.

Minimum Harvestable Age
Interfor says the MHAs used in the base case should be based on yields that include OGSI adjustments and genetic gains. The company also says an analysis should be done to determine at what age 95 percent of maximum annual growth occurs in second-growth stands, versus the age being used in operational harvesting plans.

The Sierra Club says the *Data Package* specifies minimum ages for harvest that will undermine BC's competitive advantage – the ability to produce valuable, large timber. They say the short rotation approach is bad for both the ecology and the economy.

Regeneration and Silvicultural Systems
Interfor says the assumption of a four- to five-year regeneration delay likely reflects delays in reporting rather than the actual regeneration delay in the field. The company says they reviewed records from 87 blocks and established the average delay as one to three years (for 74 percent of the blocks).

Interfor also notes that a mitigation strategy for Known Scenic Areas is to reforest within two years, and says this should be modeled.

The Sierra Club says the statement that 75 percent of the harvested area will be clearcut with reserves does not provide sufficient information, and they ask for more information on the retention levels in those reserves. The group notes that forest industry initiatives to employ more publicly acceptable silvicultural systems should be considered in the analysis, as these systems will create a downward pressure on timber supply.

An individual says that alternative harvesting systems, including single tree selection, are required on a significantly larger portion of the landscape in order to not negatively impact tourism/recreation desirability.

Green-up Requirements
The Sierra Club says that although the *Data Package* indicates that natural regeneration means a green-up delay, it is also usually more ecologically appropriate, sustaining soils and genetic diversity. If weaker green-up standards will be used to increase the AAC, this should be made explicit, according to the Sierra Club.

Visual Quality
Interfor says that in general the objective has been to reduce the impact of visual quality objectives (VQOs) on timber supply and therefore the upper limits of the allowable ranges of VQOs should be used. The company says this is reasonable, given all the downward pressures affecting timber supply.

The Regional District of Mount Waddington asks to know the number of hectares of forest land removed from the land base due to VQO designations. The regional district says it's important to know the economic loss to the forest industry if land is protected from logging because of its visual quality to cruise ships transiting the area.

The Sierra Club asks if the public, particularly tourism and recreation interests, were involved in the designation of "known" scenic areas. The group requests details on the "known" areas and also those excluded from the list.

Recreation and Cultural Factors
The Sierra Club says the fact that a digital version of a completed recreation features inventory is not available is not an adequate reason to not use the information contained in the inventory.

The Sierra Club expresses surprise that although the TSA possesses significant archaeological and cultural heritage values, no netdown from the land base will be applied. The group questions if First Nations have been asked if they're satisfied that the existing inventories capture their cultural resources for Timber Supply Review purposes.

Riparian Management
The Sierra Club says riparian inventories are not mentioned but are needed at a finer scale than current forest cover mapping in order to capture recommended management for smaller streams. The group says the timber supply analysis should anticipate increases in riparian management (beyond Forest Practices Code requirements) due to demands for improved management of small streams. The Sierra Club says problems with misclassification may also mean that the 1995 study used to model riparian management underestimated reserves.

Interfor says given the large impact of riparian reductions, an independent review or further analysis of assumptions is needed. The company reports on a review that they conducted of harvested blocks, and concludes the riparian reductions should be much lower than the *Data Package* assumes.

An individual notes the effect of absorption and trickle rates in old-growth forests, and says that harvesting, even with a riparian zone, greatly increases the volume of water and sediment entering streams, thereby affecting fish.

Watershed Management
The Sierra Club says the analysis should anticipate that there will be more community watershed designations as citizens realize that community watersheds receive greater protection under the Forest Practices Code.

Biodiversity and Wildlife
Interfor says area reductions for Wildlife Tree Patches (WTPs) are based on meeting 75 percent of WTP requirements outside the timber harvesting land base. The company says it's their experience that a greater proportion than that comes from outside the harvesting land base, and this could be demonstrated through a spatial analysis of this assumption.

Interfor notes that the base case will incorporate variable retention harvesting on 25 percent of the land base with the assumption that retained volumes do not contribute to landscape level biodiversity. The company also says that until the final landscape unit boundaries and biodiversity emphasis options are determined, these negative-influencing assumptions should not be modeled.

The Sierra Club says the Identified Wildlife Management Strategy is well underway and the government policy that it will have an impact of one percent during the next five years should be accounted for in this timber supply analysis. In general, the group notes that data on wildlife habitat is grossly inadequate for forest management.

An individual submission expresses concern about endangered and at-risk species, and questions whether there is sufficient knowledge about the needs of these species to enable harvesting to occur without disrupting or dislocating them. This individual asks for an example of an area that has been logged and still has a thriving grizzly bear population, and also questions how changes to the Forest Practices Code will affect species diversity.

Land-Use Planning
The Sierra Club says that although the Central Coast Land and Resource Management Plan (CCLRMP) is not completed, the Timber Supply Review should anticipate and plan for the results of this process. Otherwise, the group says, harvesting pressures may be created in certain areas as a result of protected areas or other decisions.

The Sierra Club asks how the Vancouver Island Land Use Plan is dealt with, and notes that they, along with many tourism and recreation interests, reject this plan and its Higher Level Plan order. The group says the Timber Supply Review should not assume the plan will be legislated as is.

Socio-Economic Factors
An individual questions how other values besides forestry were assessed, saying this is important due to the rapidly rising economic impact of tourism on Vancouver Island. This individual asks how the value and impact of tourism have been calculated, while expressing the opinion that it has been substantially excluded from consideration. There is a need to diversify economics from a major reliance on just one industry, according to this submission, yet the analysis does not indicate any assessments in this regard and what options might exist. This individual requests an independent review of the assumptions in the analysis.

Timber Supply Area Analysis Report

Operable Land Base
The Goletas Forestry Consulting Group provides updated operable area maps for the East Creek watershed and the Goletas Forest Licence area. They express the belief that the operable land base in the *Analysis Report* is too conservative and does not reflect actual harvest areas available.

Low Sites
Mill & Timber Products Ltd. provides an estimate of the total area of potential development on low sites within their operating areas. The company notes this information refers to proposed development only, and in reality the numbers are likely high due to economic feasibility and various constraints (e.g., operability, visuals). While the numbers show the company has about 6.5 years of harvest left on their licence, the actual number is probably closer to three to four years, according to this submission.

Regeneration and Silvicultural Systems
The Goletas Group says regeneration delay should be around two years, since most planting occurs within two years of harvest but may not be reported for another year or two until a formal survey is completed.

The Goletas Group requests a sensitivity analysis on enhancing silviculture practices (such as fertilization), saying if the analysis shows significant increases in future volumes, it may be worthwhile to increase silvicultural activities.

Riparian Management
The Natural Resources Defense Council (NRDC) expresses the opinion that insufficient netdowns were made for riparian areas due to the use of the inadequate riparian provisions of the Forest Practices Code. According to NRDC, the federal Department of Fisheries and Oceans (DFO) made clear to the BC Forest Service in February, 2000, that the riparian protection given to small fish-bearing streams and their tributaries is inadequate. The NRDC says DFO invoked the federal *Fisheries Act* to request specific protections for these streams (details provided).

Wildlife Management
The Sierra Club says that although Wildlife Habitat Areas have not yet been established, the Identified Wildlife Management Strategy policy is in place and the analysis should therefore model at least a one percent reduction in the timber harvesting land base to account for species at risk.

Biodiversity
The Sierra Club expresses the belief that the policy of converting all "natural" stands in the timber harvesting land base (THLB) to "managed" stands within the next 100 years will disqualify timber extracted under this policy from eco-certified markets. The group says the assumption that biodiversity and recreation needs can be met almost entirely outside the THLB may also not be consistent with certification standards. This submission notes that some critical habitat needs and biodiversity functions are closely associated with the most productive forest areas and eco-certification standards will likely demand that biodiversity reserves be placed where they are needed (often overlapping with the THLB).

Land-Use Planning
The Sierra Club says the planned timber harvest for this TSA is inconsistent with the definition of ecosystem-based management contained in the Framework Agreement of the CCLRMP, due to the explicit plan to alter the structure and age composition of the most productive portions of the forest.

Alternative Rates of Harvest
The Sierra Club makes several points relating to alternative harvest rates and the related socio-economic effects:

- no analysis was done of the costs faced by government (for watershed restoration, water purification, etc.) under current harvest levels.
- no modeling of an alternative rate of harvest was done to show how provincial revenue will be affected over time by the declining quality of the timber resource, the loss of access to the certified wood market, or the reduced opportunities for non-timber sectors to generate revenue.
- there's no exploration of a harvest rate that would slow the consumption of original old-growth forests, or plan for a long-term harvest of old timber, to provide quality wood for the value-added sector. Wood quality is given insufficient attention in the analysis.
- BC's competitive advantage lies in high-quality, premium timber grown on long rotations and in BC's exceptional craftspeople, as well as world-class wilderness experiences, biodiversity and other forest ecosystem services.

Socio-Economic Factors
An individual submission says over the last 50 years he has witnessed a severe decline in the quality of the red and yellow cedar that woodworkers rely on for traditional value-added enterprises. He says the best old growth is long gone and the rest has been high-graded,

and maintains this constitutes theft from future generations of the opportunity to create economic wealth from traditional crafts based on quality wood, as well as a theft from unceded territories of First Nations. This individual says tourism, recreation and non-timber uses must be better accommodated, now that the primary resource liquidation-dependency has been recognized as unwise.

Minister's Letter to Chief Forester
The Sierra Club asserts that the "sustainability" referred to in the letter is not equivalent to the sustained yield of timber, and therefore a long-term perspective not limited to the benefits of timber production should be taken. Noting other government objectives regarding forest management, the Sierra Club says it would be in line with the Crown's social and economic objectives to reduce the rate of harvesting.

In addition, the Sierra Club says the Minister of Forests directed the chief forester to consider local objectives where these are consistent with provincial objectives. In their opinion, if local objectives are consistent with long-term sustainability, they should be considered. However, objectives inconsistent with sustainability do not fit the parameters set for forest management and should be given little weight, according to the Sierra Club.

Other Comments

Many submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Timber Supply Review Process
Interfor says there's a significant disconnect between timber supply analysis and the operational ability to achieve the determined AAC, not due to a lack of timber but due to time-based issues such as access to available second-growth stands, green-up for visuals and adjacency, and micro-level rates of cut. The company says this disconnect is not adequately reflected in the timber supply analysis, and requests further analysis and information as follows:

- test the impact of giving priority to harvesting second-growth stands rather than old-growth stands.
- test the impact of modeling green-up on a two-pass harvest system rather than three- and four-pass.
- develop information regarding the timber flow over time by landscape unit, to address macro-level analysis vs. micro-level implementation.

Interfor also says mapping of site index and biogeoclimatic ecosystem classification units must be completed for the entire TSA before the next Timber Supply Review. The company says this information could affect estimates of available volumes (as current research indicates that regenerated strands are outperforming expectations in most cases) as well as assumptions for harvest ages, green-up ages and biodiversity.

The Sierra Club makes a range of comments on the Timber Supply Review process, as well as recommending additional analyses that should be undertaken. Their comments include the following:

- several forest management considerations are not identified, such as treaty negotiations, endangered species provisions and market pressures for certified wood. These changes should be anticipated in the next five-year period.
- inventories have not been specified for important forest values that may impact the timber harvesting land base. In particular, data regarding wildlife habitat is grossly inadequate.
- research results are not treated consistently. For example, very little substantiated research is necessary to drive a "positive influence" on timber supply yet studies on endangered species habitat requirements do not produce a similar "negative influence."

- the precautionary principle should be used to estimate the land base available for sustainable commercial harvest. Otherwise there will be undue pressure on land managers to compromise other forest values.

The Sierra Club also comments extensively on deficiencies in the socio-economic analysis. The group refers to relevant sections of the *Forest Act* and the *Ministry of Forests Act*, and asserts that the analysis will not provide the information the chief forester needs to comply with those sections. The Sierra Club identifies many gaps in socio-economic information, including the following:

- full consideration of benefits and costs, including costs of environmental degradation, forest industry subsidies, depletion of natural capital, consequences for First Nations, and loss of opportunity for other sectors.
- how the net social and economic benefits (both immediate and long-term) derived from the forest vary with the AAC. Benefits must be much broader than timber flows and the number of forest industry jobs.
- issues surrounding timber quality, the requirements of the certified wood market, and the needs of the value-added industry.
- the implications of various AACs on environmental quality, biodiversity, First Nations, other economic sectors and flows of non-timber forest products.
- how the Crown's financial interest changes as high-value stands are liquidated and replaced by low-volume and low-value second-growth stands.

The Sierra Club expresses concern that current management assumptions imply a continuation of a high rate of harvest that generates many costs not factored into the analysis, and these costs will gradually erode BC's social and economic welfare. In addition, the group says many issues that relate to First Nations' concerns must be addressed.

Alder Management Practices

Coast Mountain Hardwoods notes the lack of any apparent alder management strategy, despite the existence of their alder licence. The company says the policy that limits the planting of alder to 20 hectares per year must be reviewed, and expresses the belief that 60 percent of areas logged under their licence should be planted to alder. The company makes the following points:

- the question of plantation survival and the success of the alder industry are no longer a matter of supposition. Worldwide demand for alder is growing annually.
- the Vancouver Region's stocking standards recognize that alder can be a preferred management option on certain sites. This must be recognized in the Kingcome Timber Supply Review.

Harvest Levels and Partitions

Coast Mountain Hardwoods says that after the last Timber Supply Review the chief forester said the discrepancies between the studies performed by the BC Forest Service and by the licensee to examine the alder supply should be reconciled prior to the next AAC determination. This has not been done, according to the company, and they request a meeting to discuss a compromise that would form the basis for the apportionment that will follow this Timber Supply Review. Coast Mountain says the AAC for their alder forest licence should be between 27,000 and 44,000 cubic metres.

The Regional District of Mount Waddington expresses concern about the potential socio-economic impacts of a reduced AAC.

Interfor says the base case forecast of an initial harvest level that is 5.7 percent less than the current AAC is significantly lower than preliminary indications suggested. They request a clarification of the factors that contributed to the reduced base case harvest level.

Kingcome Timber Supply Area

An individual says the current AAC is unsustainable at nearly 50 percent above the long-term harvest level by volume and immeasurably more by value, and says it must be reduced to a realistically-sustainable level immediately. This individual also suggests a partition for cedar (similar to the one for red alder), and says that without this, cedar will continue to be targeted for the greatest immediate profits while the full-profile utilization of hemlock is avoided.

The Sierra Club expresses concern that the timber supply scenarios involve a rate of harvest that will be to the province's social and economic disadvantage, will not protect the Crown's financial interests, and will involve unacceptable levels of ecological risk. The group's reasons include the following:

- wood will be excluded from eco-certification (due to, for example, the old-growth conversion policy).
- opportunities will be reduced for non-timber sectors and for the value-added sector (because they rely on old-growth wood).
- unacceptable costs will be imposed on First Nations, exposing the Crown to potential liability for compensation.
- the lack of an allowance for the Identified Wildlife Management Strategy.
- by setting an AAC that encourages logging at or beyond the total economic margin (if the full costs of logging were calculated, including social and environmental costs), the province experiences a net economic loss.

The Sierra Club says a competing demands study should be undertaken to address the benefits and costs of projected harvest levels and to assist in identifying a harvest level that maximizes the net social and economic benefits to the province.

Appendix 1

Submissions received by the Port McNeill Forest District

Submissions received on the Data Package

Local government
Regional District of Mount Waddington (two submissions)

Forest industry
International Forest Products Ltd. (three submissions)
Coast Mountain Hardwoods Ltd.

Interest groups
Sierra Club of BC

General public
Two individual submissions

Submissions received on the Timber Supply Analysis Report

Forest industry
International Forest Products Ltd.
Goletas Forestry Consulting Group Ltd.
Mill & Timber Products Ltd.

Interest groups
Natural Resources Defense Council
Sierra Club of BC

General public
One individual submission